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ROYAL COMMISSION.

FINAL REPORT.

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PREFACE.

The demand for the Final Report of the Dominions Royal Commission has been so considerable that it has been decided to reprint it in a form more accessible to the general public, and adapted in particular to the convenience of readers and students overseas.

The demand for republication has come mainly from the Dominions, but it may be hoped that the present volume will serve a useful educational purpose in the United Kingdom, and that it will bring to its readers a clear conception of the existing resources of the Self-governing Dominions and of their potential development, together with an appreciation of the responsibilities which this splendid national inheritance entails upon all who are concerned with the determination of the future policy of the Empire.

D'ABERNON.

London.
March, 1918.

HISTORY OF THE DOMINIONS ROYAL COMMISSION.

The Dominions Royal Commission came into being in consequence of a resolution passed by the Imperial Conference of 1911 (*see* [Cd. 5745], p. 18). The members were first appointed on the 15th April 1912.* Six represented the United Kingdom, and one each Canada, Australia, New Zealand, the Union of South Africa, and Newfoundland.

In accordance with the wish of the Imperial Conference the Commission held sittings not only in the United Kingdom, but also in all the Self-governing Dominions.

The main object of the Commission was to inquire into and report upon—

(*a*) The natural resources of the five Self-governing Dominions and the best means of developing these resources.

(*b*) The trade of these parts of the Empire with the United Kingdom, each other, and the rest of the world.

(*c*) Their requirements, and those of the United Kingdom, in the matter of food and raw materials, together with the available sources of supply.

It was also empowered to make recommendations and suggest methods, consistent with existing fiscal policy, by which the trade of each of the Self-governing Dominions with the others and with the United Kingdom could be improved and extended.

---

* The original Commission was printed with the First Interim Report [Cd. 6515], and a further Commission dated 24th February, 1913, will be found printed with the original edition of the Final Report [Cd. 8462].

After the work of the Commission had been interrupted in consequence of the outbreak of war (*see* paragraph 1 of Report), the Government of the Commonwealth of Australia decided to withdraw its representative, Mr. Donald Campbell, LL.B.

The Commissioners signing the Final Report were as follows:—

United Kingdom.

Lord D'Abernon, G.C.M.G. (*Chairman*).
Sir H. Rider Haggard (Norfolk).
Mr. T. Garnett (Lancashire).
Sir W. Lorimer (Scotland)
Mr. J. Tatlow (Ireland).
Sir A. E. Bateman, K.C.M.G. (London).

Canada.

The Rt. Hon. Sir G. E. Foster, K.C.M.G.

New Zealand.

Sir J. R. Sinclair.

Union of South Africa.

Sir J. W. S. Langerman.

Newfoundland.

The Hon. Sir E. R. Bowring.

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DOMINIONS ROYAL COMMISSION.

REPORT.

TO THE KING'S MOST EXCELLENT MAJESTY

CHAPTER I.—INTRODUCTION.

MAY IT PLEASE YOUR MAJESTY

1. In presenting this Final Report we begin with a brief summary of the course of our labours.

The Commission was appointed by Your Majesty on the 15th April, 1912, and our enquiries, in all, have therefore extended over nearly five years.* In the course of this period we have travelled for many tens of thousands of miles to, through, and from the self-governing Dominions of Your Majesty's Empire. In every district of this vast area we have done our utmost, collectively and individually, to make ourselves acquainted with its characteristics, its history, and its aspirations, as we hope, and indeed believe, not without success. We have also had the opportunity of hearing personally the opinions of every section of its population upon the problems on which we have been engaged. It is therefore with a certain confidence as to their value that we present our unanimous conclusions for Your Majesty's consideration.

Sittings and Tours of Commission.

2. Our sittings ended, as they began, in London. We have also been able to visit every capital of every State or Province in each of the five self-governing

---

* Our sittings for hearing evidence were suspended from the autumn of 1914 until August 1916 on account of the War.

Dominions, and have taken evidence in all the most important cities. After assembling in the United Kingdom, we made, in all, four tours as a Commission, the first to New Zealand and Australia, the second to the Union of South Africa, the third to Newfoundland and Eastern Canada, and the fourth to Central and Western Canada.

In the course of our sittings for the purpose of taking evidence we have held the following meetings, and examined the following number of witnesses:—

—	Meetings.	Witnesses examined.
United Kingdom	42	152
Canada	39	286
Australia	34	170
Union of South Africa...	27	141
New Zealand	15	76
Newfoundland	4	26
Total	161	851

Acknowledgments.

3. We wish to return our thanks for the kindness which we have received in every part of the self-governing Dominions of the Empire, and to bring to Your Majesty's special notice the interest and enthusiasm which this Empire investigation—the first of its nature that has been made—has excited everywhere.

Evidence, statistics, and memoranda have been prepared for us by the Departments of State, by public and private bodies, and by individual witnesses and experts in all parts of the Empire. For this assistance we tender our most grateful thanks.

We would also express our appreciation of the special arrangements made to assist us, both in London and whilst travelling, by Your Majesty's Government and the Dominion Governments, by steamship and railway administrations, and by municipal and other local authorities.

We reiterate our gratitude to the able officers appointed by their respective Governments to guide and assist us in the self-governing Dominions, particularly to Mr. F. C. T. O'Hara, Deputy Minister of Trade and Commerce in the Dominion of Canada; Mr. G. H. Knibbs, C.M.G., Commonwealth Statistician of Australia; Mr. (now Captain) Malcolm Ross, of New Zealand; Mr. Frank Robb, of the Railways and Harbours Administration of the Union of South Africa; and the Hon. P. T. McGrath, now Speaker of the Legislative Council of Newfoundland.

Scope of Investigation.

4. The method which we have adopted in carrying out the work imposed on us by Your Majesty's Commission is as follows:—

First, in addition to the statistical material set out in our various Reports, we have compiled separate volumes of statistics bearing upon—

(*a*) The supplies of food and raw material to the United Kingdom, with particular reference to the self-governing Dominions as the source of such supplies;*

(*b*) The trade statistics and trade of the self-governing Dominions, in respect of the most important articles of commerce, with the Mother Country, with each other, and with the rest of the world;†

(*c*) The chief commercial harbours of the Empire and of foreign countries.‡

---

* Published as [Cd. 8123].

† Published as [Cd. 8156].

‡ Published as [Cd. 8461].

The object of the first two of these volumes is apparent from the terms of our Commission. As to the last we have thought it essential to collect the information owing to the great importance of the co-ordination of harbour depths in relation to trade development.

Secondly, we have investigated the development, actual and prospective, of Your Majesty's five self-governing Dominions, and have considered methods, within the limits of our Commission, for the more scientific use of their natural resources and, concurrently, for the improvement and extension of inter-Imperial trade and communications.[*]

5. The results of our examination have already been submitted in part to Your Majesty in our successive Interim Reports on Australia and New Zealand, on the Union of South Africa, on Newfoundland, and on Canada.[†] It appeared to us that it would be in consonance with the terms of Your Majesty's Commission to report at once on such matters as seemed most appropriate for local and partial treatment.

It remains for us in the present Report to consider the more general problems which have come before us during our mission—in other words to deal with Imperial development and trade in their widest aspects.

Summary of Report.

6. The following summary of the succeeding Chapters will show the method of treatment and also the interconnection of the various subjects with which we deal.

---

[*] Comparison of the terms of our Commission with those of the resolution agreed to by the Imperial Conference which led to our appointment, shows that it was decided to exclude from our reference detailed consideration of the natural resources of the United Kingdom.

[†] Published as [Cd. 7210], [Cd. 7505], [Cd. 7711], and [Cd. 8457] respectively.

HISTORICAL AND DESCRIPTIVE.

Chapters II. to V. show the leading characteristics of the self-governing Dominions and the development of their trade during the period preceding the War, the leading features of that trade from an Imperial standpoint, and the need for an Imperial post-war policy. They also analyse briefly the chief resources of the Dominions and their prospects of expansion, with special reference to primary production. They further describe some of the leading measures for controlling and utilising natural resources for the common benefit which have been taken by Your Majesty's Government and the Dominion Governments during the War.

SCIENTIFIC DEVELOPMENT OF NATURAL RESOURCES.

In Chapter VI. a policy is outlined in respect of the scientific development of natural resources for the future. This policy involves a careful survey of the resources and production of Your Majesty's Empire in respect of raw materials, and their relation to Imperial requirements. The basis and preliminary figures for this survey we present in Appendix I. to this Report.

Chapter VII. deals with the need for scientific research in connection with the scheme for the development of natural resources which we propose. We examine the work of the Imperial Institute, with particular reference to its relations to the self-governing Dominions. We recommend that the Dominions should concentrate their efforts on the development of their own research institutions, and that the Institute should occupy itself in future with research work for India, the Crown Colonies, and Protectorates, and we suggest that the Royal Colonial Institute might be placed in charge of the exhibits now maintained in the Imperial Institute's galleries.

MIGRATION.

Migration, and its intimate bearing on the problems of development of the Empire, forms the subject of Chapter VIII. Special attention is called to the need for a careful statistical survey of the figures of emigration and immigration. The present lack of system on the part of Your Majesty's Government in controlling emigration is discussed, and more stringent control recommended. We comment on various problems connected with the emigration of various classes of the community, and touch upon the question of the land settlement of ex-soldiers.

IMPERIAL COMMUNICATIONS.

Chapters IX. to XI. have reference to the vital problems connected with the communications of the Empire. In Chapter IX. stress is laid on the need for deeper harbours and the co-ordination of harbour depths in order to facilitate cheap, speedy, and efficient transport. Recommendations are made for developing fast Imperial services on several of the most important trade routes of the world. We comment on the existing situation with regard to ocean freight rates and make proposals for their future regulation. We also deal with the question of the respective liability of shipowners and shippers under bills of lading.

Chapter X. is a corollary to Chapter IX. It sums up and comments upon the various matters brought to our notice with reference to the handling of produce from the self-governing Dominions in the ports of the United Kingdom, and the distribution of that produce in the Mother Country.

In Chapter XI. the cable and wireless services between the United Kingdom and the self-governing Dominions are discussed, and suggestions made for improvement of services and reduction of rates.

IMPROVEMENT IN COMMERCIAL PRACTICE.

Chapters XII. and XIII. contain our conclusions on various commercial questions of importance to the future development of inter-Imperial trade. In Chapter XII. we analyse the Commercial Intelligence systems of the United Kingdom and of the self-governing Dominions and the Consular system in its relation to the Dominions. We describe the defects of the Imperial statistical system, and make proposals for effecting improvements. We also deal briefly with International and other exhibitions. Chapter XIII. has reference to the effect of divergences of commercial legislation on the development of inter-Imperial trade. It discusses the existing want of uniformity in legislation on patents, trade marks, &c., and indicates the lines on which improvement should be sought.

CREATION OF AN IMPERIAL DEVELOPMENT BOARD.

In Chapter XIV. we criticise the past and existing deficiencies in Imperial organisation, and outline a scheme for the creation of an Imperial Development Board, which shall be charged with the duty of caring for, and promoting, in the various ways described, the development of the natural resources, trade, and communications of the Empire.

CONCLUSIONS AND RECOMMENDATIONS.

Lastly, in Chapter XV., we summarise the Conclusions at which we have unanimously arrived and the Recommendations which we unanimously make.

CHAPTER II.—GENERAL SURVEY.

7. The task entrusted to us by Your Majesty differs in an important respect from that given to any other Commission that has been appointed by the Crown, in that our investigations have involved journeys throughout all the self-governing Dominions. Thus the vastness of these portions of Your Majesty's possessions has been brought home to us, and we have come into personal touch with the various populations who are engaged in developing these parts of the Empire. We are, therefore, in a position to present, not only a summary of their wealth and natural resources which, however imposing, may fail to impress those who lack an individual acquaintance with the Empire overseas, but also a general survey of the characteristics and possibilities of these various parts of Your Majesty's Dominions, based on our own observation, and on local expert knowledge.

Canada.

8. Few people quite realise the extent of the Dominion of Canada. When they are told that it covers an area of nearly four million square miles, the figures convey no idea to their minds. Even when they are informed that this is one-twelfth of the land surface of the earth, or that the British islands might be placed 30 times over within this area, these interesting facts do not perhaps impress them as much as they should do. The only real way to obtain a good idea of the gigantic limits of this Dominion is to travel through it, preferably when the heat of the summer or the cold of the winter is sufficiently intense to make the visitor anxious to reach his destination.

9. Let us follow a voyager making a journey through the Dominions such as we ourselves have made. Supposing that he first sets foot in Canada at Victoria,

the beautiful capital of the Province of British Columbia, and of the fertile Vancouver Island. Thence he sails to the city of Vancouver on the mainland, and perhaps proceeds straight across the continent by the Canadian Pacific Railway. First he will traverse hundreds of miles of wild scenery that is among the finest in the world, threading his way through successive mountain ranges with ice-capped peaks and sides clothed with forest, skirting and crossing rushing rivers and still lakes, and turning aside perhaps to visit valleys of fertile farming and fruit lands, or mining camps where the ores of the Province are being extracted with energy and success.

10. At the township of Banff situated on the eastern slope of the Rockies, an example may be seen of the effects of the conservation policy of the Dominion Government. In these mountains some thousands of square miles of country have been set apart for the preservation of the wild fauna of Canada. Thus on these great national estates is found the buffalo, an interesting species that only just in time was saved from utter extinction. Here, too, the moose and elk are to be seen and the beaver is permitted to build his dam untroubled by the trapper or the farmer. In short this reserve and others of the same character are a paradise of wild things. Of the policy which has created them to be the joy of future days we wish to express our heartiest appreciation.

11. Or the traveller may take the steamer from Vancouver northwards to Prince Rupert, one of the most beautiful sea trips in the world, if indeed it can so be called, since the greater part of this route runs through straits bordered on either hand by tree-clad mountains or through fiords which will remind him of those of Norway and New Zealand. In these woods grow gigantic Douglas pine and cedars of unknown age and in number uncounted. Great as is the timber

industry of British Columbia, as yet it has made comparatively small impression upon the vastness of the supplies thus stored up by nature for centuries, and the inaccessibility of many of the forests makes them difficult to fell at a profit.

12. Prince Rupert is but a little town situated upon rocky slopes by the shores of a wonderful harbour. A few years ago these stony " lots " changed hands during the season of the " boom " at prices that seem almost incredible. Then came the " slump " and after the slump the War, with the result that there, as in many other Canadian cities, the choicest lots remain unbuilt upon and their last purchasers have, for the present, failed to realize on their investment. In short, notwithstanding the advantages of its magnificent harbour and position, and the fact that it is the terminus of one of the transcontinental railways, Prince Rupert's expectations of becoming one of the world's great ports still remain unfulfilled. Doubtless, however, its day will come.

13. From this town our traveller will start by the Grand Trunk Pacific Railway and journey past Indian villages, lakes, woods, and fertile valleys that if cleared would support a great population in a lovely climate, till Mount Robson in its grandeur stands out before him, and he crosses almost without knowing it, so slight is the gradient, the summit of the pass through the Rocky Mountains.

14. Thereafter our voyager, whichever route he has taken, descends again through the foothills to the plains, and in succession traverses Alberta, Saskatchewan, and Manitoba. The mountains first fade into outlines and then vanish behind him, and all around, as far as the eye can reach and a hundred times farther, stretches a plain for the most part of soil of extraordinary richness. It is in these Provinces that the wheat is grown for which Canada is famed, the

best wheat, perhaps, in the whole world. From the railways the traveller does not see much of it; indeed, though a large part has been disposed of,* the land appears to be largely uncultivated, and in fact not more than a small fraction of the acres available in these Provinces has yet been opened up by the plough. Partly through lack of labour and capital, partly through undue speculation, the work of settlement is still in its infancy. When he does see wheat in good cultivation, however, he will know, if he be an agriculturist, what returns this soil can give notwithstanding the snows and cold of a somewhat rigorous winter.

15. So he passes in succession through Calgary, Medicine Hat, Moosejaw, Regina, and Brandon, or, if he prefers the more northerly route, through Edmonton and Saskatoon. These seen, with many other thriving prairie towns, he comes to the great city of Winnipeg, and shortly afterwards enters the vast province of Ontario which, as seen from the train, is a land of pines and lakes, though, in truth, its resources are almost endless. Towards the north, gold, silver, and nickel abound. There, too, is the famous "Clay Belt," with its many openings for settlement. In the south and east mixed farming prospers, and apples, peaches, pears, and grapes flourish in profusion. In Ontario also, London, Toronto, Hamilton, and many other cities bear testimony to the growing industrial life of the Dominion.

16. At length, Ottawa, the capital and seat of the Dominion Government, is reached, whence our traveller proceeds to Montreal, the greatest manufacturing city in Canada, and Quebec, the beautiful chief city of the Province of that name, with its quaint streets and old-world air. As he looks on either side of the fertile valley of the St. Lawrence, oats, hay,

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* *See* Fifth Interim Report [Cd. 8457], p. 13 *ff.*

and clover in profusion, and the prosperous dairy farms, testify to the love of the French Canadians for their land.

17. At Quebec begins the last stage of the journey. Our voyager passes through New Brunswick, with its farm and forest lands now being opened up, and Nova Scotia, world-famous for its apples, and fortunate in the ample coal supplies on its shores. Finally, if he be wise, he crosses to Prince Edward Island with its red soil and thriving farms, the Garden Province of the Dominion. There prosperity and comfort are seen on every hand, though in recent years the fashion for breeding silver-black foxes has tempted the Prince Edward Island farmer to risk his savings in the search for more quickly acquired wealth.

18. When this journey over thousands of miles is finished the traveller will have a more adequate idea of the extent of the Dominion of Canada. To understand it fully, however, he ought also to pass from south to north and to make excursions into regions where at present no railways run.

19. The climate of Canada is supposed to be extremely severe, but in this connection it must be remembered that the Dominion has not one but many climates. That of most of British Columbia is like southern England, only with more brightness and more rain. In Manitoba and Saskatchewan the cold is severe for a part of the winter, but the dry air and the large proportion of sunny days modify conditions materially. In summer there are occasional extremes of heat, but generally cool nights. The climate of Alberta, again, is much milder owing to the prevalence of the Chinook winds which reach it from the Pacific Ocean. In Northern Ontario and Quebec the winters are long, the snow is abundant, and the degrees of frost occasionally run very low. The average winter weather, however, is healthy and agreeable. In Southern Ontario the winter is comparatively short

and mild. In both Provinces the summers are pleasant with occasional short spells of extreme heat. In the Maritime Provinces the moderating influence of the sea is felt; there is more moisture and fewer extremes of heat and cold. One generalisation, however, can be made, namely, that excepting its extreme north, all the districts of Canada are admirably suited to the health conditions of the European, and to the production of a splendid and vigorous race.

Australia.

20. Australia, like Canada, is so vast a country as to baffle brief description. Much of the interior is so dry that, unless subterranean waters, such as have been found in many districts of the continent, prove to be abundant there also, it cannot be looked upon as possible of settlement. Other parts of the Commonwealth, again, are tropical. Thus it has yet to be proved that the Northern Territory, together with parts of Queensland and Western Australia, are suited to be the home of a large white population. There remain enormous areas, mainly in the coast belt, as healthy as any country in the world, and, in addition, blessed with a beautiful climate and sufficient rainfall.

21. Tasmania, which lies to the south, is one of the most lovely islands known. Great regions of it are still clothed with primeval timber which as yet the bush fires have spared. The cleared lands have been proved to be specially suitable to the growing of apples and other crops, such as the hop vine. Indeed, there are spots which remind the visitor of the fields of Kent, even to the oast-houses dotted here and there and the comfortable and established farm-steadings by which they stand. The minerals of Tasmania are numerous and rich and it is believed that the island contains a great untapped wealth of copper, zinc, tin, and other ores.

22. Of the three southern States of the mainland, South Australia, Victoria, and New South Wales, little need be said. Their cities are famous everywhere, particularly Sydney with its wonderful harbour, Melbourne with its wide streets and open spaces, and Adelaide with its circle of park lands. Much of their land is very rich and, where adequately cultivated, yields a large return. Their sheep, especially those of New South Wales, are the most famous in the world. In all three States fruit-growing is largely carried on, particularly in the more southern districts, whilst South Australia and Victoria are the principal wine growing States of the Commonwealth.

23. Throughout these territories flourish the various species of eucalypts which are, or were, peculiar to Australia. The aspect of these trees may be thought by some to be monotonous, especially when they have been "ringed," but at least they give to the Australian landscape a character that is not to be found elsewhere. In some of the more arid parts, great irrigation schemes have been completed or are in progress, such as that of the Murrumbidgee area in New South Wales, and others almost as large in Victoria, to say nothing of those in which the waters of the great Murray River are being utilised. Throughout these States minerals abound. Ballarat, in Victoria, was one of the first seats of the gold industry, and there that metal still continues to be mined. Broken Hill, in New South Wales, is celebrated for its complex ores of silver, lead, and zinc, whilst in South Australia are the unique mountains of hematite known as Iron Knob and Iron Monarch.

24. New South Wales contains two objects of special interest, alike to the settler and the traveller, Kosciusko, the highest mountain in Australia, and Canberra, the future capital of the Commonwealth. The latter is remarkable for the serene beauty of the site and atmosphere and for its possibilities, but as yet

little has been done towards the erection of the metropolitan city which is one day to stand upon its slopes.

25. One of the most interesting journeys to be made in Australia is that from Adelaide to Port Augusta (whence starts the Transcontinental railway to Perth, now in course of completion) and on to Oodnadatta, 480 miles away in the heart of the Australian desert. This is accomplished over a line of railway that was built at great expense with a view of connecting South Australia and the Northern Territory. At Oodnadatta, a spot that has been visited by very few Australians, it comes, however, to a full stop. The traveller along this line passes the mysterious waters of Lake Eyre that lie below the level of the sea, and receive the drainage of great parts of Queensland. As the lake has no exit, these waters evaporate in the heat of the burning sun, leaving behind them a length of more than a hundred miles of salt-encrusted slime. Amidst the sand-polished brown stones of the desert and the eaten-out salt bush appear occasionally tiny oases of intense verdure. These are caused by the existence of artesian boreholes. Round these bores may be seen droves of camels, sometimes in the charge of Afghans, strange people to meet with in Central Australia. These camels are at present the sole means of land communication between Oodnadatta and Port Darwin in the Northern Territory.

26. Western Australia, so far as its remoter parts are concerned, has hardly been explored and much less put to use. It first became generally known through the discovery of gold which drew a great population of diggers to its various fields. Indeed, the largest output of Australian gold still comes from the East Coolgardie goldfield, which contains the mining centre of Kalgoorlie. This district is supplied with water by a pipe line about 350 miles in length, the construction of which was one of the engineering feats

of the day. Everything will grow beneath the sunshine of this State, that is, where water can be obtained, and in it stock do extremely well. Moreover, it has great resources in its reserves of timber. Hence comes the jarrah that is used for piles and railway sleepers and in blocks for the paving of city streets. Hence, also the karri, one of the most valuable and gigantic of the eucalypts. Perth, the capital of this State, is a city of remarkable beauty and the same may be said of Albany with its splendid but little-used harbour. At the back of Albany are stretches of excellent fruit land of which the Mount Barker district is at present the most developed.

27. Queensland is so enormous that the whole United Kingdom might be placed five times over within its borders. It is very fertile, and in parts hot, for half of it lies within the tropics. Indeed, on his arrival at Brisbane from, let us say, Melbourne, the visitor becomes aware of a remarkable change in temperature, while a walk through the lovely public gardens of the former city, filled as they are with palms and other semi-tropical vegetation, over which the uncanny flying foxes flap at nightfall, will remind him of India or Ceylon. Notwithstanding its temperature, however, all stock and European cereals flourish in Queensland, especially on the Darling Downs. In the northern portions of the State also grow sugar cane, coconut trees, rubber, mangoes, and every other tropical product. In fact all that is needed to make the output of these warm and well-watered lands as enormous in quantity as it is excellent in quality is a sufficiency of labour.

28. At present in respect of mineral production Queensland stands fourth in the list of Australian States, but so great is its natural wealth in this particular, that there are many who believe it will ultimately be first of them all.

29. One of the remarkable features of this State is its wondrous forests. Eucalypts of many species flourish in the more southern districts but further north, for example in the neighbourhood of Cairns, they give place to other trees, many of them gigantic in size and of great beauty and variety. It is a melancholy sight to see these fine cabinet woods given over to the ravages of fire, however necessary this may be considered economically, because as yet it does not pay to carry and export the timber. The soil upon which they grow, however, is so rich and well-suited to the cultivation of sugar cane, that the fact of this waste does not hinder their destruction by the hand of man.

30. Queensland has many natural features of great beauty. Among these the Barron Falls near Cairns are perhaps the most striking. It may be added that the voyage to that town from Pinkenba, the port of Brisbane, running as it does within the Great Barrier Reef, is one of the loveliest in the world, if at times not without danger. This passage was first achieved by Captain Cook in the 18th century. At certain places as the ship glides along the densely wooded shores, where only a few aborigines have their huts, flights of brilliant butterflies pass above it. Occasionally, too, may be seen snow-white cockatoos flying slowly against the dark green background of the forest.

New Zealand.

31. New Zealand is made up of several small and of two main islands, the latter separated from each other by Cook Strait, which is much used as a waterway between the east and west coasts of the Dominion. In total area it nearly equals the British Isles, but as in shape the islands are long and narrow, the distance from north to south is considerably greater. This results in somewhat marked variations of climate.

Thus, while Dunedin in the south is cool, Auckland in the north has an atmosphere and vegetation which remind the visitor of those of sub-tropical lands.

32. Many people, if they were asked what struck them most about New Zealand, would reply—its beauty. It is a land of snow-capped mountains and of fertile plains. It has forests and swiftly-flowing rivers. The fiords of its western coast will compare with those of Norway. It has mountain-encircled lakes with waters of varying hue, as lovely as any to be found in Europe. Its scenery attracts thousands of visitors every year, and is an asset of ever-increasing value.

To the traveller, perhaps the most remarkable district in New Zealand is that of Rotorua, which is famous for its health-giving thermal springs resorted to in large numbers by the ailing from many lands. Although none of its geysers equal the Great Geyser in Iceland in the volume of water ejected, the largest, in the village of Whakarewarewa, spouts to a height of 80 feet and furnishes a very remarkable spectacle.

33. Many of the Maoris, who are the aborigines of New Zealand, live in this Rotorua district. They are an extremely fine and warlike race whose qualities are fully recognised by the New Zealanders themselves. They take their part, through their representatives in Parliament, and in other directions, in the administration of the Dominion, have their places in its learned professions, and share the honours of its Universities. They own large areas of land of very high quality in the North Island, portions of which are gradually coming into European settlement. It is, however, the fixed policy of the Dominion to conserve for the Maoris adequate areas of land for their requirements. A few of the older men in their youth may have shared in the fierce tribal warfare and perhaps fought against the British in the sixties. To-day, however, the Crown

has no more loyal subjects than are the Maoris. Their history and the study of their traditions are full of interest to those who devote attention to such matters.

34. Outside the mountain regions the soil of New Zealand gives great returns to the farmer and the pastoralist, while its sheep, after passing through the freezing works, are famous on the British meat market, and indeed furnish no inconsiderable proportion of its supply of mutton and lamb. Its wool, too, is amongst the most notable of New Zealand products, and in fact is the leading export from the Dominion. Owing to the advantages of its climate and the richness of its herbage New Zealand is extremely well suited to small-holdings, which tend to increase in number year by year. This is, in part, due to the policy of the Dominion, which encourages the subdivision of large areas. The best land is very valuable and continues to rise in price. Dairy products such as cheese and butter are exported in ever increasing quantities. In fact, taking its external trade in comparison with its population, New Zealand stands first in the Empire.

35. The Kauri pine of New Zealand is, perhaps, unique among trees, if only for the vast age to which it attains. Unfortunately it is being rapidly cut out and is for sundry reasons very difficult to preserve. The fossilised gum of this tree is dug up in great quantities, and, after treatment, forms one of the best known varnishes.

36. In comparison with some of the other Dominions, New Zealand has no great store of mineral wealth. But it has produced a good deal of gold, and its iron sands and coal are valuable assets, the best of its coal being of very high quality. Its water power, too, constitutes a resource of great importance.

37. Except for the added brightness of its skies, New Zealand may be described as another Britain in the southern seas. From the beginning it has attracted a

class of settler worthy of the best traditions of the Motherland. The education and training which the Dominion offers to its growing generation more than maintains those traditions. In its social legislation and the even distribution of its wealth New Zealand is probably more advanced than any other part of the Empire.

Union of South Africa.

38. In many ways South Africa is one of the most attractive countries in the world, as will be readily acknowledged by all who have dwelt within its boundaries. Its charm would be hard to analyse, but undoubtedly it exists. This cannot be set down entirely to climate, beautiful though it is, or to the wide expanses of the rolling veld, or to the grandeur of its mountains, or to the charm of its woodland scenery. These doubtless contribute to its many attractions, but the real cause lies deeper and results in the fact that to those who have made South Africa their home and even to those who have made a temporary sojourn there, it will always remain the one country to which they desire to return.

39. To the traveller approaching from the North and West the first port of call in the Union is the City of Capetown, situated on the shores of Table Bay, justly compared for its beauty and blue waters to the Bay of Naples. Capetown is the capital of the Province of the Cape of Good Hope, the oldest Province of the Union, and has been the seat of its Legislature since unification. Pretoria, the capital of the Transvaal Province, is the seat of Government.

40. In the early days, when the Portuguese sailed round the Cape, in their attempt to circumnavigate Africa, it was named the Cape of Storms. Later, the Dutch East India Company, finding it a promising land, and a convenient half-way house to their

Eastern possessions, planted their flag on the shores of Table Bay and gradually extended their sway northwards. It was they who gave the name "Cape of Good Hope"—a happy augury for the future.

To this day the passage *viâ* South Africa remains one of the most important Imperial routes to the British possessions in the East as well as to Australia and New Zealand. If only on account of its situation, South Africa takes a most important place among the Dominions of the Crown.

41. Capetown itself has a picturesque appearance with its quaint flat-roofed houses; its situation at the foot of the unrivalled Table Mountain, with the ranges of the Drakensberg in the blue distance, fills the newcomer with admiration.

Its neighbourhood has many interesting features reminiscent of the early settlers. To the Dutch, it owes its beautiful trees, whose rich green foliage adds to the charms of its countryside, the stately oak avenues in and around Capetown, and the comfortable buildings with their distinctive style. To the French Huguenots who settled in the Stellenbosch and Paarl valleys near by is due the cultivation of the vine, which has grown in profusion ever since, and whose grapes excel in flavour.

42. The interior of South Africa has changed much within the last 40 years. Then the northern portions were in part still black with game and men now living have shot buck upon the very site of the market place of Johannesburg, the Golden City. To-day the game has largely gone and on the veld where once it roamed the pastoralist and the cosmopolitan financier pursue their respective, if widely differing, avocations.

To prevent, however, the extinction of the beautiful and varied fauna of South Africa, the Union Government has set aside reserves. Thus, in the Tzaneen Estate in the Transvaal Province, specimens of every indigenous kind of wild life are to be found in abundance, whilst in the Cape Province a sanctuary has been made for the preservation of the elephant.

43. South Africa is a country of infinite variety of natural resources, but its wealth, as at present developed, is chiefly mineral. Of diamonds it has a practical monopoly in the deposits of the Cape Province, the Transvaal, and the Orange Free State. The Rand area alone produces some 40 per cent. of the gold supply of the world. The coalfields of the Cape Province and of Natal are of vast extent and easily accessible.

Copper and iron are also found in the Union, though as yet the latter is not worked. In fact, its base metals and minerals have as yet scarcely been touched, and a wide field is open for the enterprise alike of the capitalist and the manufacturer. In days to come, given an adequate skilled population, the Union may grow into one of the great industrial lands of the world, for its coal, as it chances, is found in places within easy reach of its gold and iron areas.

44. Yet to the agriculturist and planter the country possesses many attractions also, especially to those possessed of energy, ability, and knowledge.

The Cape Province offers opportunities for growing cereals of all kinds, and for fruit and vine cultivation.

In the Orange Free State maize, wheat, and oats can be grown, and in the Transvaal not only these crops, but barley and rye also. In Natal sugar, coffee, and tea are extensively produced, and in several parts of the Union cotton and tobacco are being cultivated with success, as are also all kinds of citrus fruits.

45. To the pastoralist opportunities are abundant. He can breed sheep, horses, cattle, and ostriches on a large scale in many districts. The mildness of the climate lends itself to the successful rearing of stock, and there is no need for shelter from excessive heat or extreme cold. Granted immunity from pests and

diseases, a question with which we deal later on in this Report, there are bright prospects for the future.

46. Much, too, depends on a successful policy of water conservation. The bulk of the cereals of the Union is grown on land which has a comparatively small rainfall, but almost everywhere water is necessary to turn to profitable use for small holdings the rich agricultural soil which is found extensively in the Union. Thus, the great Karroo will grow anything where dams have been made to conserve water, or boreholes put down. In certain parts of the Union, however, the rainfall is abundant, especially along the coast belt of the Cape Province and in Natal. In these favoured spots all fruits grow abundantly, as do other products of the earth.

47. To those who are in search of health South Africa is a resort which is famous throughout the world, and invalids who have visited its highlands return filled with gratitude for their pure health-giving air. To the sportsman, too, the Union still offers a happy hunting ground.

48. South Africa has a native population that outnumbers the whites by at least four to one, and this disproportion is not decreasing. The existence of this population, while it adds to the difficulties of its rulers, provides a supply of labour without which its mining and agricultural industries could scarcely be carried on upon their present scale. It also constitutes a strong argument in favour of the expansion of industrial enterprise in the future.

Newfoundland.

49. Newfoundland, the oldest of the British Colonies, has characteristics distinct from those of any other part of the Empire. It stands like a fortress at the gates of the great Gulf of St. Lawrence. Its coast line is rugged and indented with many harbours, but within it is a pleasant land of lakes, rivers, and forests,

interspersed with valleys well adapted to grazing and other agricultural purposes. Its climate, if rigorous in winter, is warm in summer and autumn, and healthy throughout the year. Its mineral wealth is considerable, especially of iron, of which ore there is a practically inexhaustible supply. But the real source of livelihood of most of its inhabitants is to be found in the surrounding seas. The fisheries of Newfoundland, in particular those of cod, have been famous since the days of John Cabot, who discovered the island over four centuries ago, and are still as productive as they ever were. Many of the people of the Colony during part of the year practice agriculture, or work in the mines or forests, but at the proper seasons they join the fishing or the sealing fleets.

50. The population of the island is not large, nor does it increase as rapidly as might be wished, chiefly owing to the emigration from it to Canada. The quality of the race, however, can by no means be estimated by its numbers, since the people of Newfoundland are among the hardiest, most virile and industrious of those of British stock. They are by nature sailormen skilled in all navigation and accustomed to the dangers of the seas. Further, and perhaps because of this aptitude which is the heritage of men who from generation to generation have had dealings with the deep, they show a remarkable versatility in their power of adapting themselves to the conditions of other pursuits and trades.

51. The coast of Labrador, which is of vast extent but very thinly peopled, is a dependency of Newfoundland. Its mineral resources, as yet scarcely tapped, are believed to be great, and the same may be said of its forests and its fisheries. An interesting suggestion, more fully dealt with later on in this Report, is that potash in large quantities might be extracted by burning from the immense stores of kelp which now rot upon its shores.

Conclusion.

52. A survey such as that which we have given naturally invites a brief comparison between the British self-governing possessions to-day and the greatest Empire of the ancient world, that of Rome.

53. The Roman Empire, being concentrated and continuous, escaped some of the difficulties which confront the British Empire. The extreme distance between the Capitol and its farthest dependency was at the most 2,000 miles, whereas the extreme distance between London and the outer borders of the farthest self-governing Dominion is over 12,000 miles, or half the circumference of the earth. In a sense such spaces have been annihilated by the use of electricity and their inconveniencies mitigated by that of steam. Still, as the present war teaches, routes so extended must always remain open to attack and add to the anxieties of government.

54. Where figures are concerned certain salient facts emerge from the shadows of the past. The approximate size of the Roman Empire was 1,400,000 square miles. Canada with nearly 4,000,000 square miles, and Australia with 3,000,000, are each more than double this size. If to these areas be added that of the British Isles, with the three smallest of the self-governing Dominions, namely, New Zealand, the Union of South Africa, and Newfoundland, about 750,000 square miles in all, it will be seen that those portions of Your Majesty's Empire alone overpass the area of that of Rome in a ratio of five to one.

55. Again, an approximate estimate for the population of the Roman world in the time of its greatest prosperity was 85,000,000. In all the regions conquered by Rome there were indigenous populations of varying density. In the self-governing portions of Your Majesty's Empire, we find that their 65,000,000 inhabitants (including more than 5,000,000 natives in

the Union of South Africa), are most unequally distributed. Of these no less than 45,000,000 live in the two small islands which form the United Kingdom, leaving but 20,000,000 (inclusive of all population of non-European blood) to occupy the more than 7,000,000 square miles of the five Oversea Dominions.

56. It is, however, in the scale on which the population migrated from the homeland to the outlying parts that there lies the most striking contrast between the ancient Empire, and those parts of Your Majesty's possessions over which our inquiries have extended.

Rome was not a colonizing power in our sense of the word, but one whose chief object was to rule and hold. In her case, the occupation and development of the distant parts of the Empire was not the life work of hundreds of thousands of the best of her citizens. Her settlements were confined to the establishment of small groups, largely composed of disbanded legionaries, in selected centres on frontiers, military highways, and trade routes.

57. British rule is directed to ends widely different in character. Its policy is not merely directed to secure settlement in chosen spots, but to encourage it in all the wide areas within the Empire's boundaries, suited for the maintenance and well-being of its people. All that is asked of those who find a new home overseas is to assist in the development of the country of their choice, in whatever manner best suits their training and inclination.

58. To what extent this task has been achieved, how best it can be forwarded by well-directed Government action and co-operative effort, it is the object of the succeeding chapters of this Report to indicate.

CHAPTER III.—EXTERNAL TRADE OF THE SELF-GOVERNING DOMINIONS.

59. In the description given in the preceding chapter, we have tried to present a general impression of the main characteristics and possibilities of the self-governing Dominions. We pass on to the facts and figures concerning their present stage of development, and it is desirable first to give a brief general survey of their external trade, with reference especially to the share of the United Kingdom in this trade and to the exchanges between the Dominions themselves.

Full details as to the main items for the period 1901 to 1913 have already been published in the volume prepared by us and issued under the title "Trade Statistics and Trade of the Self-Governing Dominions; Memorandum and Tables."*

Total Import and Export Trade of the Dominions and the United Kingdom.

60. In our various Interim Reports† the trade position of each of the self-governing Dominions which we have visited has been dealt with,‡ and we propose here to consider the external trade of these portions of Your Majesty's Empire collectively rather than individually. Tables are appended showing the imports into, and the exports from, the Dominions in the year 1913, distinguishing the trade with *(a)* the United Kingdom, *(b)* other parts of the Empire, and *(c)* foreign countries. We have taken the year 1913 as being the latest year in which normal trade conditions obtained.

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* [Cd. 8156.]

† [Cd. 7210], pp. 4 *ff.*; [Cd. 7505], pp. 3 *ff.*; [Cd. 7711], pp. 2 *ff.*; [Cd. 8457], pp. 2 *ff.*

‡ For a statement of the differences in the method of recording imports and exports in the various Dominions, *see* [Cd. 8156], pp. 13 20.

IMPORTS INTO THE SELF-GOVERNING DOMINIONS IN 1913.

—	Imports* (including Bullion and Specie) into—					Total Imports into the Self-Governing Dominions.	
	Canada (1913–14).	Australia (1913).	New Zealand (1913).	Union of South Africa (1913).	Newfoundland (1913–14).	Amount.	Per Cent.
From—	Million £	Million £	Million £	Million £	Million £	Million £	
United Kingdom	27·671	41·328	13·312	23·860	·797	106·968	*37·6*
Self-Governing Dominions—							
Canada	—	·965	·453	·863	1·013	3·294	*1·2*
Australia	·180	—	2·915	2·220	—	5·315	*1·9*
New Zealand	·688	2·220	—	·069	—	2·977	*1·1*
Union of South Africa	·599	·271	·008	—	—	·378	*0·1*
Newfoundland	·384	·003	0	—	—	·387	*0·1*
Total, **Dominions**	1·351	3·459	3·376	3·152	1·013	12·351	*4·4*
Other parts of Empire	3·490	5·516	1·660	1·920	·069	12·655	*4·5*
Total, **Empire**	32·512	50·303	18·348	28·932	1·879	131·974	*46·5*
Foreign Countries	103·060	29·447	3·940	13·865	1·286	151·598	*53·5*
Total	135·572	79·750	22·288	42·797	3·165	283·572	*100·0*

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* For a statement of the differences in the method of recording imports and exports in the various Dominions, *see* [Cd. 8156], pp. 13–20.

EXPORTS FROM THE SELF-GOVERNING DOMINIONS IN 1913.

—	Exports[*] (including Bullion and Specie) and Re-exports from—					Total Exports from the Self-Governing Dominions	
	Canada (1913–14).	Australia (1913).	New Zealand (1913).	Union of South Africa (1913).	New-foundland (1913–14).	Amount.	Per Cent.
To—	Million £	Million £	Million £	Million £	Million £	Million £	
United Kingdom	46·317	34·757	18·130	59·033	·678	158·915	*58·9*
Self-Governing Dominions—							
Canada	—	·169	·607	·019	·411	1·206	*0·4*
Australia	·980	—	2·316	·111	—	3·407	*1·3*
New Zealand	·403	2·357	—	·005	—	2·765	*1·0*
Union of South Africa	·799	1·941	·062	—	—	2·802	*1·0*
Newfoundland...	·994	—	—	—	—	·994	*0·4*
Total **Dominions**	3·176	4·467	2·985	·135	·411	11·174	*4·1*
Other Parts of Empire	1·770	4·990	·151	1·981	·115	9·007	*3·3*
Total **Empire**	51·263	44·214	21·266	61·149	1·204	179·096	*66·3*
Foreign Countries	48·528	34·310	1·721	4·296	1·949	90·804	*33·7*
Total	99·791	78·524	22·987	65·445[†]	3·153	269·900[‡]	*100·0*

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[*] For a statement of the differences in the method of recording imports and exports in the various Dominions, *see* [Cd. 8156] pp. 13–20.

[†] Excluding Parcel Post and ship's stores (£1,215,000). These items are not recorded by countries.

[‡] This total becomes 271·115 if South Africa exports by Parcel Post and if ship's stores are included.

61. The above tables contain a certain amount of duplication, inasmuch as the merchandise exchanged between the Dominions themselves naturally appears as imports in the first table, and as exports in the second. These duplicate entries represent an amount of about 12,000,000*l*. Making allowance for them, and adding certain items of South African trade which cannot be subdivided in the export table above, a total figure of about 542,000,000*l*. is obtained, as representing the value of the external trade of the five self-governing Dominions in 1913.

62. For purposes of comparison we add a table showing the total oversea trade of the United Kingdom in 1913, and the share of the different self-governing Dominions in that trade:—

IMPORTS AND EXPORTS OF THE UNITED KINGDOM IN 1913.

In Trade with	Imports (including Bullion and Specie) into the United Kingdom.		Exports (including Bullion and Specie) from the United Kingdom.						Total Trade.	
			United Kingdom Production.		Re-exports.		Total.			
	Amount.	Per Cent.	Amount.	Per Cent.	Amount.	Per Cent.	Amount.	Per Cent.	Amount.	Per Cent.
Self-Governing Dominions.	Million £		Million £		Million £		Million £		Million £	
Canada	32·754	*3·9*	23·995	*4·1*	3·512	*3·2*	27·507	*3·9*	60·261	*3·9*
Australia	38·802	*4·6*	34·552	*5·9*	3·359	*3·1*	37·911	*5·5*	76·713	*5·0*
New Zealand	20·660	*2·5*	10·912	*1·9*	·952	*0·9*	11·864	*1·7*	32·524	*2·1*
Union of South Africa ...	50·528	*5·9*	22·262	*3·8*	1·869	*1·6*	21·122	*3·5*	74·650	*4·9*
Newfoundland	1·005	*0·1*	·881	*0·1*	·115	*0·1*	·996	*0·1*	2·001	*0·1*
Total, **Dominions** ...	143·749	*17·0*	92·602	*15·8*	9·798	*8·9*	102·400	*14·7*	246·149	*16·0*
Other parts of Empire	97·150	*11·6*	125·349	*21·3*	3·817	*3·5*	129·166	*18·5*	226·316	*14·7*
Total, **Empire** ...	240·899	*28·6*	217·951	*37·1*	13·615	*12·4*	231·566	*33·2*	472·465	*30·7*
Foreign Countries ...	601·864	*71·4*	369·436	*62·9*	95·960	*87·6*	465·396	*66·8*	1,067·260	*69·3*
Grand **Total**	842·763	*100·0*	587·387	*100·0*	109·575	*100·0*	696·962	*100·0*	1,539·725	*100·3*

Development of Trade since 1901.

63. Rapid development has characterised the external trade of the self-governing Dominions since the beginning of the present century. In the year 1901 their total imports were approximately of the value of 130,000,000*l.*; in 1913 they were valued at about 284,000,000*l.*—an increase of 118 per cent. Similarly, exports from the Dominions increased from 126,000,000*l.* in 1901 to 271,000,000*l.*—a growth of about 115 per cent. The total external trade of the Dominions amounted, after allowance is made for duplicate entries, to 244,000,000*l.* in 1901 and, as we have already shown, to 542,000,000*l.* in 1913.

It is interesting to observe that during the period in question the growth of the external trade of the Dominions was more rapid than the growth of the external trade of the United Kingdom. Between 1901 and 1913 the total imports into the United Kingdom increased by 52 per cent., and the total exports therefrom by 86 per cent.

64. The following tables indicate the growth of the import and export trade of the Dominions year by year since the beginning of the present century, and show how accentuated the development has been during the recent years:—

IMPORTS INTO THE SELF-GOVERNING DOMINIONS.

Years.	Canada.*	Australia.	New Zealand	Union of South Africa.†	New-foundland. ‡	Total.
	Million £	Million £	Million £	Million £	Million £	Million £
1901 ...	40	42	12	34	2	130
1902 ...	44	41	11	50	2	148
1903 ...	50	38	13	53	2	156
1904 ...	54	37	13	35	2	141
1905 ...	56	38	13	34	2	143
1906 ...	61	45	15	31	2	154
1907 ...	77	52	17	27	2	175
1908 ...	65	50	17	24	2	158
1909 ...	82	51	16	29	2	180
1910 ...	98	60	17	39	3	217
1911 ...	117	67	20	38	3	245
1912 ...	144	78	21	40	3	286
1913 ...	136	80	22	43	3	284

EXPORTS FROM THE SELF-GOVERNING DOMINIONS.

Years.	Canada.*	Australia.	New Zealand	Union of South Africa.†	New-foundland.	Total.
	Million £	Million £	Million £	Million £	Million £	Million £
1901 ...	40	50	13	21	2	126
1902 ...	44	44	14	29	2	133
1903 ...	47	48	15	31	2	143
1904 ...	44	57	15	34	2	152
1905 ...	42	57	16	41	2	158
1906 ...	53	70	18	46	3	190
1907 ...	58	73	20	43	3	197
1908 ...	54	64	16	48	2	184
1909 ...	63	65	20	49	2	199
1910 ...	62	74	22	54	2	214
1911 ...	66	79	19	57	3	224
1912 ...	82	79	22	63	3	249
1913 ...	99	79	23	67	3	271

* From 1901 to 1906 the figures given are for the years ending June 30; for 1907 onwards the figures relate to the twelve months ended March 31 of the years following.

† The figures for years prior to 1910, the date of the formation of the Union of South Africa, are approximate only.

‡ The figures given are for the years ended June 30.

Trade per head of Population.

65. The value of the external trade of the self-governing Dominions in 1913 amounted to a total of 542,000,000*l*. The white population of these parts of the Empire is estimated to have been about 15½ millions in the same year. On this basis the trade in question is equivalent to 35·0*l*. per head of the population. In the same year the aggregate of the import and export trade of the United Kingdom, including as in the case of the figure quoted for the Dominions the re-export trade as well as the imports and exports of bullion and specie, amounted to nearly 1,540,000,000*l*., or 33·5*l*. per head of the population. In proportion therefore to population, the external trade of the Dominions as a whole is slightly greater than that of the Mother Country.*

That the trade of the Dominions has already attained this position is striking evidence of the energy and enterprise with which Your Majesty's subjects overseas have applied themselves to the development of the vast natural resources of the lands they occupy, and to the extension of their commercial intercourse with other States.

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* Figures for each of the Dominions separately are given in our Fifth Interim Report (*see* p. 3 of [Cd. 8457]). New Zealand comes first, Australia second, Canada third, Newfoundland fourth, and the Union of South Africa fifth. The comparison, however, is subject to certain qualifications, viz:—

(1) We have made no allowance for the purchasing and productive power of the native population, especially in South Africa (*see* pp. 4, 5 of [Cd. 7505]).

(2) The aggregate figure for United Kingdom imports and exports includes a very much higher proportion of re-export trade than that for the Dominions. The value of merchandise re-exported from the United Kingdom in 1913 was about £110,000,000, whilst the re-export trade of the Dominions amounted only to a value of about £10,000,000.

It is difficult to assign a definite value to the former of these two factors in calculating the external trade of the Dominions per head of population. Estimates are given in our Third Interim Report [Cd. 7505] comparing the value of the imports into Australia, New Zealand, and South Africa on the basis of the assumed purchasing power of the native populations. But there are obvious difficulties in the way of assigning an approximate value to the effect of the producing power of the native population on the export trade. Even if a very liberal allowance is made for the productivity of the non-white population, it represents a trade which is far less than the re-export trade of the United Kingdom.

Preference.

66. In all the self-governing Dominions, with the exception of Newfoundland, a reduction in the ordinary amounts of import duty on all, or most, articles of commerce is allowed when they are the produce and manufactures of the Mother Country, and some or all of the Dominions. The amount of the reductions and the parts of the Empire to which they apply vary in each of the Dominions. In our Second, Third, and Fifth Interim Reports we have given details of the preferential arrangements in Australia, New Zealand, the Union of South Africa, and Canada.

The following table gives the amounts of rebate on United Kingdom goods imported into these four Dominions during the years preceding the outbreak of war:—

Year.	Canada.*	Australia.	New Zealand. †	Union of South Africa.
	Million £.	Million £.	Million £.	Million £.
1910	1·303	·972	·536	·539
1911	1·376	1·071	·725	·538
1912	1·667	1·266	·715	·549
1913	1·573	1·244	·760	·555

* For years ended March 31 of the year following.

† The figures for New Zealand include rebates on goods from parts of the Empire other than the United Kingdom.

67. In Australia and South Africa preference is granted by means of a reduction on the ordinary rates of duty, whilst in New Zealand a similar effect is attained by imposing a surtax on certain classes of goods when they are of foreign manufacture. A third system obtains in Canada; the Customs Acts provide for three tariffs, viz.:—British Preferential Tariff,

the Intermediate Tariff, and the General Tariff, and the few parts of the British Empire which do not enjoy the rates of the British Preferential Tariff pay duty according to the intermediate rates or receive other reductions in the General Tariff rates.

68. The application of preferential duties as between the Dominions themselves is partly the result of definite arrangements for reciprocity. Arrangements of this kind obtain, for example, between South Africa and Australia, and between South Africa and New Zealand. But, as a general rule, preferential treatment to the goods of one Dominion entering another is not accorded as a result of any definite arrangement between the States concerned. The same observation applies to the grant of preference on United Kingdom goods in the Dominions.

Inter-Dominion Trade.

69. The trade between the self-governing Dominions themselves amounts to about 12 millions sterling annually, but more than half this total represents the interchange between neighbouring territories, that is to say, between Canada and Newfoundland and between Australia and New Zealand. The long distance trade between the Dominions amounts to only about 5,000,000*l*. annually, or barely one per cent. of their total external trade. This figure is roughly made up as follows:—

	£
Trade between South Africa and Australia	2,000,000
Canada and Australia ...	1,000,000
Canada and New Zealand	1,000,000

The remaining 1,000,000*l*. represents mainly trade between Canada and South Africa, and between New Zealand and South Africa.

70. The total value of inter-Dominion exchanges was roughly the same in 1913 as in 1901, but in 1901

there were abnormally large exports to South Africa from Australia, Canada, and New Zealand as a result of war conditions. In 1906 the total inter-Dominion trade had fallen to about 10,000,000*l.*, of which the long distance trade amounted to about 3,500,000*l.* only. Much has been done in recent years to stimulate this trade by means of preferential tariff rates and by the grant of subsidies to steamship services. In particular subsidised mail services exist (1) between New Zealand and Canada, and (2) between Canada and South Africa, under contracts which contain provisions intended to foster the exchange of produce between the Dominions concerned. This trade is, however, still in its infancy, and much more could be done to encourage it. In particular, trade between Australia and New Zealand on the one side and Canada on the other is, as was pointed out in our Second and Fifth Interim Reports,* capable of great development. Such development must depend largely on the maintenance of adequate, regular, and rapid steamship services.

Trade of the Dominions with the United Kingdom and Foreign Countries.

71. The tables which appear on pp. 28 and 29 show that in 1913 38 per cent. of the imports into the self-governing Dominions were received from the United Kingdom, while of the exports 59 per cent. were sent to the United Kingdom. In 1901 the percentage of imports from the United Kingdom was 46 per cent., and the percentage of the exports to the United Kingdom 53 per cent. The figures for 1901 were undoubtedly affected by war conditions in South Africa, when the normal shipments of gold to the United Kingdom were not being made in their usual volume. But an examination of the detailed tables of the trade

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* [Cd. 7210], p. 33, and [Cd. 8457], p. 6.

of the Dominions prepared by us[*] confirms the indication given by a comparison of these percentages, viz., that the share of the United Kingdom in the import trade of the Dominions has been decreasing and its share in the export trade increasing.[†]

72. The share of the Dominions in the oversea trade of the United Kingdom is shown in the Table on p. 31. Of the total imports into the United Kingdom in 1913 the five self-governing Dominions contributed 17 per cent., whilst of the total exports of British and Irish produce and manufacture they took 15·8 per cent. These figures show an increase over those for 1901, when the share of the Dominions in the import trade was 12·2 per cent., and in the export trade 14·3 per cent.

73. In this connection, a comparison of the balance of trade of the Dominions with foreign countries and with the United Kingdom reveals an interesting position. In 1913 exports from the Dominions to the Mother Country exceeded imports therefrom by 52,000,000*l*., whilst imports from foreign countries exceeded exports thereto by 61,000,000*l*. The exact figures are given below, viz.:—

—	Imports into the Dominions.	Exports from the Dominions.	Excess of	
			Imports.	Exports.
In trade with :—	Million £.	Million £.	Million £.	Million £.
United Kingdom ...	106·968	158·915	—	51·947
Foreign Countries ...	151·598	90·804	60·794	—

74. The remarkable difference between the nature of United Kingdom and foreign trade with the Dominions, as shown by these figures, is somewhat

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[*] [Cd. 8156].

[†] *Note.*—To this latter statement Canada forms an important exception

attenuated when allowance is made for the re-export of Dominion produce, and especially raw material, from the Mother Country.

The trade returns of the United Kingdom show that in 1913 raw materials produced in the Dominions were re-exported from the Mother Country to a total value of 20,000,000*l*.

This does not, however, account for the whole of the differences shown, which are largely caused by the nature of the trade between Canada and the United States. From the United States of America Canada bought merchandise in 1913-14 to the value of 89,000,000*l*., whilst the exports from Canada across the American border were valued at 42,000,000*l*. only.

75. Whilst these considerations serve to explain, to some extent at least, the astonishing difference between the balance of the trade of the Dominions with foreign countries and the balance of the trade with the United Kingdom, the position obviously requires further analysis and consideration, and we therefore proceed to examine the nature of the external trade of the Dominions as divided over the leading categories of merchandise.

The following is an analysis of the import and export trade of the Dominions in 1913, divided into the headings of—(1) food, &c., (2) raw materials and articles mainly unmanufactured, (3) articles wholly or mainly manufactured, viz.:—

Imports.	Imports into the Dominions.		Exports.	Exports from the Dominions.	
	From the United Kingdom.	From Foreign Countries.		To the United Kingdom.	To Foreign Countries.
	Million £.	Million £.		Million £.	Million £.
Food, &c	8·5	22·6	Food, &c.	58·3	17·3
Raw materials and articles mainly unmanufactured.	4·5	35·9	Raw materials and articles mainly unmanufactured.	52·1	45·8
Articles wholly or mainly manufactured.	91·1	85·6	Articles wholly or mainly manufactured.	8·4	18·7

76. It is noteworthy that the Dominions purchase almost as large a quantity of manufactured articles from foreign countries as from the United Kingdom, and that their sales of raw materials to foreign countries (including re-exports from the United Kingdom) are larger than to the Mother Country. Both these facts emphasise the importance of improved means of communication, and show how large a need there is for these and other measures for betterment, to be undertaken by Your Majesty's Government in conjunction with the Governments of the Dominions, and the mercantile community in all parts of the Empire.

77. We may be permitted to give one example of lack of attention in the past to the promotion of inter-Imperial trade, to which we alluded in our Fifth Interim Report.* No steps have, as yet, been taken to ensure that the large amounts of capital advanced in the Mother Country for public works and similar objects in the self-governing Dominions shall, within due limits, and without burdening enterprise or creating a monopoly, increase the opportunities of the manufacturers of the Empire. We would repeat the opinion already expressed that the promotion of a new policy in this respect is urgent, and should be one of the first and most serious duties of the British Trade Bank, now in course of establishment in accordance with the recommendations of the United Kingdom Committee on Financial Facilities for Trade.† We think that this Bank should not only stipulate that orders in connection with any new undertakings which it may finance in the self-governing Dominions, should be placed as far as possible with British manufacturers, but should exert its influence to induce other financial establishments in the United Kingdom to follow its own example.

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* [Cd. 8457], pp. 8–9.

† [Cd. 8346], p. 7.

CONCLUSION.

Need for an Imperial Trade Policy.

78. It has been a commonplace for years that British manufacturers and merchants should be stimulated to study and cultivate the Dominion markets, and to produce goods of the nature and quality which are required by consumers across the seas. It has equally been a commonplace that the manufacturers of the Mother Country should be urged to use the vast resources of raw materials which the Dominions possess. The difficulty has lain in suggesting acceptable measures for the realisation of these ideals. Hitherto the proposals made have been mainly the work of advocates of some particular fiscal or other theory, which they have pressed, in season and out of season, as a universal remedy. In our judgment these counsels, however important they may be, cover only a part of the problem. An Imperial policy, in the broadest sense, must include much that is not fiscal. There is no short cut to the formulation of such a policy; what is needed, in our view, is detailed examination of existing conditions, and practical and definite proposals for the removal of difficulties and for securing co-operation.

CHAPTER IV.—NATURAL RESOURCES OF THE SELF-GOVERNING DOMINIONS.

79. We next propose to give a short general description of the natural resources of the five self-governing Dominions included within our terms of reference, in so

far as these resources have not already been dealt with in our various Interim Reports.*

Such a survey naturally falls under the following five heads, viz.:—Agricultural and Pastoral Resources, Minerals. Forests, Fisheries, and Water Power.

AGRICULTURAL AND PASTORAL RESOURCES.

80. In the course of our journeys we have done our utmost to consider and take note of the agricultural resources and opportunities of the various self-governing Dominions. We have found that in one part or other of those Dominions all animals and almost every crop flourish that are needed for the sustenance and use of man, and we believe, especially if products of the more tropical parts of the Empire which were not included in our investigation are taken into account, that the Empire could meet not only its own needs but those of friendly neighbouring countries.

81. We do not propose in this Final Report to laden its pages with undue statistical detail. We will therefore briefly set out the general conclusions at which we have arrived as regards the agricultural and pastoral industries of the self-governing Dominions. Those industries, taken as a whole, are but in their infancy. By this is meant that every beast reared and every

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* For example, the following matters are discussed in the Reports mentioned below :—

Cotton Industry in Australia and South Africa [Cd. 7210], pp. 48–51, and [Cd. 7505], pp. 35–6.

Mining and Agricultural Industries of South Africa [Cd. 7505], pp. 11–38.

Fishing, Forest, and Mining Industries in Newfoundland [Cd. 7711], pp. 5–10.

Live Stock Industries of Canada [Cd. 8457], p. 42–3.

Nickel and Asbestos Production in Ontario and Quebec [Cd. 8457], p. 45–7.

Fur-Farming in Prince Edward Island, [Cd. 8457], p. 43–4.

These subjects are either omitted altogether, or mentioned very briefly, in this Report.

grain of corn grown, in our opinion, could be multiplied many times in the various districts of the Empire, provided that men existed in sufficient numbers to breed the cattle or cultivate the grain, if markets were open to absorb the produce, and if economical and scientific means of transport to such markets were established. Omitting those of other countries, such markets do exist in the United Kingdom but are at present largely supplied from foreign lands. As an example we may mention Denmark, which is able by dint of good organisation, and individual skill and industry, to export to the United Kingdom enormous quantities of butter, bacon, and eggs which could equally well be produced locally or in the Dominions.

82. During our journeys throughout the Empire we have been impressed by the fact, which is general in the world and which is not confined to any particular epoch, that the industries engaged in the utilisation of the land are less remunerative than city trades and the occupations of middlemen and merchants. Too much of the profit appears to go to the distributing interests and not enough to the primary producer. This tends to concentrate people to an undue extent in large cities and to withdraw them from country districts where their presence is most needed. Apart from the financial attraction of the city, life there presents greater amenities and greater excitement than do agricultural and pastoral pursuits. No universal remedy can be suggested, but we hold that everything which conduces to keep an adequate proportion of the population engaged upon the land or in country pursuits, everything which increases the attraction of agricultural life, should be regarded as beneficial to the development and strengthening of the community.

83. We trust that we may not be thought to travel beyond the limits of the subject in hand when we point out all that is involved in this matter. Everywhere

throughout the Empire we have been met by the complaint, to the accuracy of which our own observation has testified, that the population either is not inclined to settle on the land, or, if it has settled there, shows a strong tendency to leave it for the cities. Thus in Australia more than half of the total population, already small enough for so vast a continent, dwells in a few towns,* nor is there any sign at present that these undesirable proportions are in course of change.

84. It is of vital importance to the Empire that the development of all the products of the land should be pushed to the maximum extent, that sufficient man-power should be devoted to the purpose, and that all the resources of invention and organisation should be utilised to increase the poduction per acre at a minimum of cost. These matters cannot be left entirely to the individual whim of the chance proprietor; supervision is needed to see that full utilisation is obtained from the available land and the available resources.

85. We will now pass on to some general remarks upon the more prominent characteristics of the agriculture of the various Dominions.

Canada.

86. The question is often asked, what proportion of the vast area of the Dominion is available for agriculture. To this there is no easy reply. Taking the case of wheat only, it is found year by year that certain qualities of early-maturing and frost-resisting grain can be grown at a profit farther north than was before believed. We can only give the latest estimate, noting that it is, at best, provisional and approximate. It is stated that of the 1,400,000,000 acres which comprise

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* Out of a total population at the end of 1914 of 4,941,000 in Australia, no fewer than 1,948,400 or 39·4 per cent. lived in the six capital cities. If the towns exceeding a population of 10,000 inhabitants are included (1,291,650) the percentage is increased to 65·31 per cent.

the nine Provinces of Canada (*i.e.*, excluding the North-West Territories and the Yukon) 441,000,000 acres, or 31 per cent. of the whole, are capable of being devoted to agriculture in the future. Of this available area less than a quarter was occupied as farm land in 1911.

YIELD OF CROPS.

87. Of the grain crops of Canada, wheat is unquestionably pre-eminent. The average production in the Dominion for the years 1910-1914 was 196,000,000 bushels and the average exports of wheat and flour 96,800,000 bushels per annum.

Of the total production, the three great Prairie Provinces alone, Manitoba, Saskatchewan, and Alberta, produced an average of 174,000,000 bushels per annum. According to a recent return only 9,500,000 acres out of a total of 58,625,000 acres of occupied farm lands were under wheat in these three Provinces, and these occupied farm lands formed only 21 per cent. of the possible farming lands in these Provinces.*

88. At the present time Canada stands fifth in the list of the wheat-producing countries. It is difficult to see why in years to come she should not be first among the countries of the world in the amount of her exportable surplus of wheat, if not in total production. If by the development of new routes, such as the Panama Canal and possibly the Hudson Bay routes, and if by the improvement of old routes such as the St. Lawrence River, the cost of the transport of wheat from the great Prairie Provinces of Canada to the markets of the United Kingdom can be reduced, the problem of feeding the industrial masses of Great Britain will be more than half solved.

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* For figures as to the Dominion lands still available for homesteading in the Prairie Provinces as on January 1st, 1916, *see* pp. 14–16 of [Cd. 8457].

89. Of Canadian grain crops, oats come second in value. The Dominion produced, on the average, 343,000,000 bushels per annum in the period 1910-1914, and now ranks as the fourth oat-producing country in the world, though her exports of oats are usually much smaller than are those of wheat.

Other grain and field crops are also produced in considerable quantities, notably potatoes, beets, carrots, turnips, barley, flax, hay and clover.

CATTLE.

90. As we have shown in our Fifth Interim Report the situation of the live-stock industry in the Dominion, as at present conducted, is not satisfactory, having regard to the advantages enjoyed in soil and climate. The decrease in the number of cattle during the last five years is shown in the following table:—

——	1910.	1911.	1912	1913.	1914.
Milch cows	2,854,000	2,595,000	2,605,000	2,740,000	2,673,000
Other cattle	4,251,000	3,931,000	3,827,000	3,916,000	3,364,000
Total ...	7,105,000	6,526,000	6,432,000	6,656,000	6,037,000

The total decrease during the five years is no fewer than 1,068,000 head of cattle or 15 per cent. The larger decrease is in " other cattle," which is deplorable in view of the desirability of augmenting the Empire's meat supply. In Ontario the number decreased from 1,629,000 in 1910 to 970,000 in 1914, or by 40 per cent. Saskatchewan, however, records a steady increase in both milch cows and other cattle.

It is satisfactory to note that the rearing of thoroughbred cattle is receiving greater attention. An increase during the decennial period 1901-1911 from 76,500 to 123,900, or 62 per cent., was recorded, mainly amongst Shorthorns, Holsteins, and Ayrshires.

Figures showing the output of butter and cheese in Canada are not available for a later year than 1910, when a census of dairy industries was undertaken. In that year the total production of butter was 201,800,000 lbs., whilst the output of cheese was 201,300,000 lbs. About two-thirds of the butter was produced on farms and one-third in factories; cheese is almost entirely a factory product. Canada carries on a large export trade in cheese, especially to the United Kingdom.

SHEEP.

91. As in the case of cattle, there has been a decline in the number of sheep reared during the same period, viz., from 2,598,000 in 1910 to 2,058,000 in 1914 or over 20 per cent. This decrease has occurred almost wholly in the Eastern Provinces. The rearing of sheep in the Prairie Provinces has been somewhat chequered owing to the tariff changes in the United States with respect to wool, which, however, now enters free. The chief difficulty to be solved is to find a " dual purpose " sheep, *i.e.*, one for meat and wool. It was represented to us that it would be advisable if constructive breeding experiments were made along the lines of the Corridale breed developed in New Zealand. We commend the suggestion to the Dominion authorities. In 1911 there were 53,600 pure-bred sheep, chiefly of the Shropshire, Oxford Down, Cotswold, and Leicester breeds.

PIGS.

92. The number of swine increased from 2,754,000 in 1910 to 3,434,000 in 1914, or by nearly 25 per cent. Ontario is the main pig-rearing Province, having about 45 per cent. of the whole. Large increases are reported in Saskatchewan, from 125,800 to 454,700 in the five years, and in Alberta from 143,600 to 397,100. A decrease, however, is noticeable in Quebec and the Maritime Provinces.

The number of pure-bred swine in the Dominion increased from 40,800 in 1901 to 56,500 in 1911, or by 38 per cent. These chiefly consisted of the Yorkshire and Berkshire breeds.

HORSES.

93. It is satisfactory to record that the breeding and rearing of horses shows a gradual increase, viz., from 2,213,000 in 1910, to 2,948,000 in 1914, or over 30 per cent. This increase has occurred mainly in the Prairie Provinces as is shown by the following figures:—

Year.	Manitoba.	Saskatchewan.	Alberta.	Total.
1910	245,000	333,000	294,000	872,000
1914	317,000	610,000	519,000	1,446,000

There was a noticeable increase also in the number of pure-bred horses during the decennial period 1901-1911, from 10,800 to 33,100, or 208 per cent. We refer in our Fifth Interim Report to the excellent results achieved in the breeding of Percheron horses, which numbered 2,760 in 1914. The chief pure-bred horse reared is the Clydesdale, the number of which was 19,900 in 1914.

SUGAR.

94. Apart from the production of sugar from the maple-tree, a small quantity of sugar-beet is to be recorded. The acreage and yield for the period 1910-1914 is shown in the following table:—

	Acreage.	Yield of Beets.
		Tons.
1910	17,000	188,000
1911	20,700	175,000
1912	18,900	201,000
1913	17,000	148,000
1914	12,100	108,600

Ontario and Alberta are the only Provinces where the raising of sugar-beet has been attempted. It is now, however, confined solely to Ontario. Only 100 acres were harvested in Alberta in 1914 and since that date the sugar refinery has been closed on account of difficulty in securing suitable labour and the disinclination of farmers to raise the beet, although the soil and climate are favourable.

In Ontario, however, the acreage has been largely extended of recent years. The Dominion Sugar Company operating in Ontario has recently successfully undertaken the growing of beet seed. The by-product, *i.e.*, beet pulp, is now turned to commercial use, being mixed with other foods and forming an important food for cattle.

TOBACCO.

95. The commercial cultivation of tobacco is confined wholly to Ontario and Quebec. The Department of Agriculture estimated the acreage and yield of tobacco in 1913 and 1914 to be as follows:—

——	Year.	Acreage.	Yield.	Yield per acre.
			lbs.	lbs.
Quebec ...	1913	5,000	4,500,000	900
	1914	4,750	5,000,000	950
Ontario ...	1913	6,000	8,000,000	1,300
	1914	5,000	6,000,000	1,200

FRUIT.

96. During the period 1891-1901, there was a marked decrease, viz., of 25,300 acres, in the acreage of orchards, but in the years 1901-1911 an increase of 47,500 acres is recorded, the total being 403,600 acres in the latter year. Vineyards similarly showed a decrease between 1891 and 1901, but a decided increase

between 1901 and 1911, viz., from 5,600 acres to 9,800 acres.

The chief apple producing Provinces are Ontario, Nova Scotia, Quebec, and British Columbia. In Ontario a remarkable decrease in production is to be recorded, viz., from 13,631,000 bushels in 1900, to 6,459,000 bushels in 1910. This decline was attributed by a witness to the growing of very poor quality fruit in recent years. An improvement is, however, to be looked for in the near future, as a great sorting-out of inferior varieties of fruit has taken place.

97. Members of the Commission were able to visit the celebrated Annapolis Valley in Nova Scotia, and the Okanagan Valley in British Columbia, where approximately 80 per cent. of the latter Province's fruit is raised. Soil and climate are suitable, but lack of labour appears to be a serious drawback to the continued development of this industry in British Columbia.

98. Of small fruits the production in the Dominion in 1910, the latest year for which details are available, was as follows:—

Grapes	32,898,000 lbs.
Strawberries	18,687,000 boxes.
Currants and Gooseberries	3,830,000 quarts.
Other small fruit	9,000,000 boxes.

The chief grape-growing district is the Niagara Peninsula, where the climate is mild. The chief varieties of grape are of the American type, and possess a peculiar "foxy" flavour, very noticeable to the visitor. European varieties of the grape cannot be grown commercially.

IRRIGATION.

99. The largest irrigation project in the Dominion is that of the Canadian Pacific Railway Company, comprising land east of Calgary, and along the line of

the railway between Calgary and Suffield. The development of the eastern and western portions of this tract of land has been actively undertaken.

Another considerable irrigation project which has been started is in the vicinity of Lethbridge, Alberta, where canals have been constructed to serve 130,000 acres. A survey has also been undertaken by the Dominion Government in the district immediately north of Lethbridge, and there are indications that there is sufficient water available in the Old Man River to irrigate a considerable tract of land. Lethbridge, indeed, would appear to be the geographical centre of a very considerable present and potential development of irrigation, and this district bids fair to become very prosperous when all the contemplated irrigation schemes mature.

South and south-west of Medicine Hat there is a further tract of irrigable land, controlled by the Southern Alberta Company. The sale of this land to the Company was conditional on the establishment of a system of irrigation works. There is a further tract in the Cypress Hills district, south-east of Medicine Hat where small irrigation schemes have been begun.

It has been roughly estimated by the Department of the Interior that there are about 50,000,000 acres of land in the southern part of Alberta and the south-western part of Saskatchewan which require irrigation, but that the present water supply is only sufficient for about one-tenth of this area.

Legislation has been in force since 1894 governing the use of water for irrigation in Alberta, Saskatchewan, and a part of the North-West Territories. A special branch of the Dominion Government has been created to deal with the technical and administrative questions arising out of irrigation schemes.*

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* Drake, p. 163 *ff.* of [Cd. 8458].

GOVERNMENT AID TO AGRICULTURE.

100. We could not fail to be impressed by the activity shown by the Government authorities, both Dominion and Provincial, in giving assistance in various branches of agricultural development.

The ways in which this assistance is given are too numerous to mention in detail, but we may touch on one or two of the most striking examples.

101. The Dominion Government has established a central experimental farm at Ottawa, which some of our members were able to visit, and some 25 other farms in the various Provinces of the Dominion. The main object of these farms is the investigation of the best methods of crop production and live stock management. At the Ottawa farm the famous "Marquis" wheat was originated, which not only yields abundantly but has taken first place in Canada, as well as in the United States and elsewhere, as a wheat of quality which matures before danger of autumn frost.

102. Again, the Agricultural Instruction Act of 1913 provides for advances from the Dominion Government to all Provinces for agricultural instruction amounting to some 2,000,000*l*. over a period of 10 years. The money has to be expended, *inter alia*, in the assistance of agricultural colleges, dairying and horticultural schools, and in initiating agricultural teaching in the public schools.

103. The Provincial Governments are experimenting in other directions in assistance to agricultural industries. Ontario and British Columbia have introduced a system of loans to farmers on easy terms on the security of their land. More than one Province makes loans to agricultural co-operative societies up to 80 per cent. of their total capital.

104. Lastly, we may mention the particularly interesting experiment by the Saskatchewan Government (the result of co-operation between the local

Department of Agriculture, the University of Saskatoon, and the Railway Corporations) in setting up a school on wheels, or "Better Farming" train. This train, the purpose of which was fully described to us in evidence by the Dean of Saskatoon University,* is fitted up for demonstration purposes in connection with live-stock, poultry, tillage, household science, &c.† It is accompanied by members of the staff of Saskatoon University and others who give lectures and demonstrations at the various stopping places. This train (which has been in existence for three years) travelled last year 700 miles in five weeks, stopping twice a day for meetings, and was clearly of the greatest value not only in teaching farmers, but in interesting boys and girls in agricultural matters. The undertaking, we think, reflects the greatest credit on those responsible for it. The Province of Ontario has already started experiments in the same direction, and we hope that the example will be copied in other provinces of Canada as well as in other Dominions.

Australia.

105. At the commencement of this Chapter of our Report we remarked that the agricultural and pastoral industries of the self-governing portions of the Empire are but in their infancy. This seems to us to be particularly true of the vast island continent of Australia. For instance it has been roughly computed that the land suitable to a production of wheat in that country is about 200,000,000 acres, out of which about 12,500,000 acres are now producing this cereal. Of cattle, sheep, horses, and pigs the same could be said; their number might be multiplied many times. Again, were the labour available, Queensland could produce an enormous quantity of sugar in comparison

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* Rutherford [Cd. 8459], p. 78.

† It also contains a nursery car where mothers can leave their babies while inspecting the train.

to its actual output. The agricultural and pastoral resources of the vast and semi-tropical Northern Territory, also, are as yet exploited to only an infinitesimal degree, perhaps because it has not yet been proved that the climate there is suited to white men and their families, at any rate if they are called upon to do heavy manual labour, and the policy of the Commonwealth prevents the importation of dark-skinned races.

106. It is impossible to say what Australia could produce if it were thickly inhabited by a land-loving race. At present, as the Official Year Book of the Commonwealth of Australia points out,* it is "the most sparsely populated of the civilised countries of the world," having a density of only 1·69 per cent. to the square mile, and, as we have already remarked, of this exiguous population more than half dwells in the cities.

107. Even so, the output from the land is large, and on it, directly or indirectly, the majority of the town dwellers exist, as well as the primary producers themselves. What then would be the case if, let us say, all the land in Tasmania, Victoria, and Western Australia that is suitable for the culture of the apple were put under that and kindred fruits? It would scarcely be too much to suppose that they, with New Zealand, could produce enough to supply the needs of a great portion of the world. They certainly could in conjunction with the crops of the fertile valleys of Canada, whose seasons alternate with their own.

108. Many in the United Kingdom link the thought of Australia with that of drought, and no doubt the rainfall behind the coast belt is deficient. Also periods of terrible dryness have afflicted the continent, and will no doubt afflict it again. It must be remembered, however, that on the coast belt there is

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* Official Year Book of the Commonwealth of Australia, No. 9. 1916, p. 111.

generally quite sufficient rain, and in Queensland even more than sufficient. Also the system of dry-farming is yearly increasing the area that is suitable to the growth of wheat, while the discovery and exploitation of subterranean waters are in many districts a great safeguard against the loss of stock by thirst. Furthermore, considerable areas of the various States are now being brought under the influence of skilled and costly irrigation schemes, and, in the last extremity, the extension of the railway systems often enables cattle and sheep to be moved from drought-stricken areas to those in which grass and water can still be found.

YIELD OF CROPS.

109. The area under crop in the Commonwealth has advanced continuously, that in 1914-15, the latest year for which complete figures* are available, amounting to 15,652,000 acres, which represents about one acre in every 122 of the total land surface. Of this total, 9,651,000 acres† were under wheat, in fact approximately the same amount as in the three Prairie Provinces of Canada. The average yield of this wheat crop, however, is extraordinarily low, amounting over ten seasons to only 10·22 bushels per acre. In one year, that of 1901-2, it only amounted to 7·54 bushels per acre, and in another, that of 1914-15, to 2·58 bushels per acre. These returns are very poor when compared with those of other countries, such as the Netherlands, with their yield in 1914 of 37·17 bushels, the United Kingdom with 32·82 bushels, New Zealand with 31·37 bushels, and even Canada which returned an average of 15·67 bushels. Few countries showed lower yields in 1915 than that of Australia, which was

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* Official Year Book of the Commonwealth of Australia. No. 9. 1916, p. 314.

† Preliminary figures for the 1915 6 season show that the area under wheat increased to 12,530,000 acres.

14·61 bushels. Indeed, the farmer in the United Kingdom will marvel how so small a yield of grain can prove remunerative, but in this connection it must be remembered that the cost of its production is also small. Land is cheap and to be purchased on an easy instalment system. Labour is considerably more efficient than that in the Mother Country. There is nothing to pay for the carting of farmyard muck, which is so costly in the United Kingdom, a little artificial manure being all that is used and this not in every instance. The turning up of the soil with many furrow ploughs drawn by a number of horses is a quick and rough business seldom followed by expensive harrowings and other processes. The same may be said of the harvesting, which involves no stacking of the corn, as it is generally stripped or threshed out by the machine on the field, the straw being left to waste as in Canada.

110. In this connection again it should be noticed that easy communications are absolutely necessary to the success of grain-growing, which cannot be profitably undertaken at a distance of more than 12 miles from a railway station on account of the cost of haulage. Therefore, there are great areas awaiting the plough that can be put to no practical use until they are traversed by railways.

CATTLE.

111. As a stock country Australia, like South Africa, has a great advantage in its climate. In some of the colder districts rugging of cattle is required during certain months, but for the most part such shelter from the weather as may be afforded by the bush or plantations is sufficient, while in the warmer districts no protection is required at all. This means, of course, that the cost of farm buildings is reduced to a minimum. Moreover, as a whole, the country is most healthy for every kind of animal, although dipping is, we believe, practised in Queensland as a preventive

against ticks and the diseases which result from the bite of these insects. It is said, indeed, that it was from Queensland that the practice of protection by dipping was introduced into South Africa.

According to the latest available figures Australia possessed in 1914 some 11,000,000 head of cattle[*] as against 6,500,000 in Canada. Its herds, and particularly those of Queensland and New South Wales, afford a most valuable contribution to the Empire's meat supply.

DAIRY COWS.

112. The number of dairy cows, as distinguished from slaughter stock, in the Commonwealth has shown a slight drop during the last five years. Of the 11,052,000 cattle in the Commonwealth in 1914, 2,019,000 were dairy cows.

The milk from these cows is for the most part dealt with in co-operative butter and cheese factories; the number of establishments in the Commonwealth where the manufacture of butter, cheese, and condensed milk was carried on numbered 528 in 1914. Of butter in the same year, nearly 54,000,000 lbs.[*] were exported, and of cheese over 2,500,000 lbs.

SHEEP.

113. As a wool producer Australia is one of the foremost countries in the world. Thus, in 1914, it possessed 78,600,000 sheep,[†] as compared with 83,546,000 in the Argentine Republic in 1912, and 57,255,000 in the Russian Empire in 1912. Under the head of sheep, however, contrary to all precedent, the difference between the two having always been recognised as wide and deep, goats are counted in the

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[*] Official Year Book of the Commonwealth of Australia, No. 9, 1916 p. 291.

Note.—This figure was much below the average of previous years

Russian Empire, so that the comparison is really more in favour of Australia than at first sight appears.

The wool of these sheep in the 1914-15 season was valued at 25,047,000*l.*, and of it only about 2 per cent. was made use of in Australia itself, the rest being exported. Of the total export, about 44 per cent. has hitherto been taken by the United Kingdom, the rest going to many other countries.

114. A great deal of frozen mutton also is now exported; its value in 1914-15 amounted to 3,414,000*l.*, of which 97 per cent. came to the United Kingdom. It is to be remarked that the number of sheep in the Commonwealth decreased by about 10,000,000 between the years 1911 and 1912, and again by over 6,000,000 between 1913 and 1914. Figures for 1915 show a further decline. Drought had much to do with this loss.

PIGS.

115. The number of pigs in the Commonwealth fluctuates a good deal. Thus, in 1910 and 1911 it was over a million, in 1912 only 845,000, in 1913, 801,000, and in 1914, 862,000.

A good deal of bacon and ham is exported.

HORSES.

116. There are few countries better suited to horse-breeding than Australia, a land where, so far as we are aware, there is no disease to contend with, such as the horse sickness of South Africa. As a consequence the breeding of horses of all classes has greatly increased during the last 20 or 30 years. Thus, in 1913, the number in the Commonwealth was 2,522,000, the highest total reached up to that year; the figure for 1914 was practically the same, but preliminary returns for 1915 show a decline to 2,395,000. The number of horses exported in the five years ending 1914-5 was 64,100, whereof the largest proportion went to India.

SUGAR.

117. In Queensland the growth of sugar cane is important. Out of a total area of 172,600 acres under this crop in the Commonwealth in 1914-5, 161,200 acres were in Queensland and 11,400 in New South Wales. The average yield of productive cane was 17·8 tons per acre in the former State and 30·2 in the latter. There is also a small area (990 acres in 1914-5) under sugar beet which yielded 10,300 tons of beet; this industry is confined to Victoria.

VITICULTURE.

118. In 1914-5 the acreage of the Commonwealth under vineyards amounted to 61,000 as compared with 65,700 acres in 1904-5, when the area devoted to vines in Australia attained its maximum. There are enormous stretches of land in Australia, and especially in South Australia, suitable to wine production, so that at first sight it seems remarkable that this industry is not carried on on a larger scale, especially as the wine is good and sound although often it suffers from insufficient keeping.

For this neglect various reasons are advanced, the chief of these being that the Australians are not large consumers of wine.

Another reason is the high price of labour; thus, at a famous wine factory in the neighbourhood of Adelaide, an excellent champagne is produced, but the price charged for it in restaurants and hotels is equal to that of the imported French champagne on which, of course, a considerable duty is paid. The reason alleged for this high price is the cost of manufacture. The result is, that whereas in 1914-5 the Commonwealth exported wine to the value of 101,400*l.*, its imports of the same product amounted to the value of 89,900*l.*, although, with the exception of the very finest brands, Australia should be able to produce all its own wines.

119. In the same year, 1914-5, considerable quantities, amounting in all to about 22,000,000 lbs., of raisins and currants were produced in Victoria and South Australia, not to mention small quantities in other States. These seem to be, for the most part, consumed locally, as are the majority of the fresh grapes grown for table use.

WATER SUPPLY AND IRRIGATION.

120. Of late years great efforts have been made by the Governments in Australia to combat the drought conditions which, from time to time, work so much evil to the country. These efforts have been made easier by the discovery of various artesian basins in which water can be tapped by means of bores. As to the origin of this water there is much argument, but, whether it be plutonic or meteoric,[*] its existence is the main thing with which we need concern ourselves. There is also argument as to whether the supply will or will not prove perennial, a matter which only the future can decide. In the year 1915 there were no less than 3,470 of these bores existing in the Commonwealth, ranging in depth from a few feet to over 5,000 feet. Through some of them the outflow of water, which is not always, however, of the best quality, is prodigious. Thus in Queensland five bores produce each over 3,000,000 gallons daily; one of them, a well at Cunnamulla, is stated to have a daily flow, when uncontrolled, of no less than 4,500,000 gallons.[†] East of the Darling ranges no artesian water has been discovered. A point which deserves special mention is the uses to which artesian water may be put. As we showed in our Second Interim Report, it is generally fit for stock to drink, in many cases it is fit for human beings to drink; but in almost all cases it is unfit for agricultural purposes on account of excess of alkali.

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[*] *Cf.* Dunstan, p. 113 of [Cd. 7172]. Pitman, *id.*, Wade, p. 116, *ibid.*

[†] Official Year Book of the Commonwealth of Australia, No. 8 191 p. 494

121. Various irrigation schemes, of which we saw several during our tour in the Commonwealth, are in progress, or have been completed, in the different States. Of these, the Murrumbidgee Northern Irrigation Scheme in New South Wales is perhaps the most remarkable. Here a large storage reservoir has been formed in a natural depression, having a catchment area of 5,000 square miles. In this the water is retained by a huge wall not yet completed, owing to unexpected difficulties in its construction, known as the Burrinjuck Dam. The main canal from this dam will be capable of supplying water to an area of about 200,000 acres for mixed farming or fruit-growing, &c.; in addition an area of about 1,000,000 acres is to be set aside for "dry" lands in connection with those under irrigation.* Many other irrigation schemes are also under consideration in New South Wales.

Victoria also has irrigation works which are generally controlled by the State Rivers and Water Supply Commission. The system in this State is for the Government to buy up properties which, from their natural position, can be brought under the influence of irrigation water, and sub-divide them for the purposes of intensive culture. By this means it is hoped and expected that the population of the districts concerned will be very largely increased. The fruit area of Mildura was the first to be irrigated, with the result that the value of the fruit grown in the year ending June, 1915, was about 400,000*l*. In the other States also irrigation schemes are in progress. Further, now that the conflicting interests of New South Wales, Victoria, and South Australia have, as we understand, been amicably adjusted, there is every prospect that the waters of the great Murray River will be put to the fullest possible use, thus rendering large tracts of fertile soil available for intensive culture.

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* Official Year Book of the Commonwealth of Australia, No. 9, 1916 p 526

AGRICULTURAL COLLEGES AND EXPERIMENTAL FARMS.

122. We cannot conclude this summary without allusion to the deep interest taken by the various Governments in the progress and success of the agricultural interests as a whole, upon which, as they are well aware, the future prosperity and greatness of the Commonwealth so largely depend. This is well exemplified by the fact that in every State, with the exception of Tasmania, agricultural colleges or experimental farms or both exist, there being five of the former and 44 of the latter in the Commonwealth. Some of these we visited and were much impressed by the good work they are doing. Further, the children in the State Primary Schools are instructed in what is known as "nature knowledge," and often work experimental plots of ground. Also there are travelling agricultural inspectors who give lectures and make practical demonstrations on various matters connected with the soil. Moreover, all the States in Australia make advances to farmers for the purpose of closer settlement, and to help them in many other ways. Up to June 30th, 1915, nearly 15,000,000*l*. had been advanced in this fashion in the Commonwealth, of which about 9,000,000*l*. remained due to the various States, the rest having been already repaid. It would appear that this system has proved itself to be financially profitable as well as agriculturally useful to the various Governments.

New Zealand.

123. The Dominion of New Zealand is one of the finest agricultural countries in the world. Although its climate is comparatively cold in some parts of the South Island, it is seldom necessary to house the cattle in winter, rugging being a sufficient protection to them. In the North Island even this is for the most part unnecessary, except perhaps in exposed situations.

There is also a good rainfall throughout the two islands, which taken together approximate 1,000 miles in length. For New Zealand as a whole, it averages about 50 inches, though that on the west coast of the South Island is much heavier, amounting in parts to well over 100 inches. As a result irrigation is unnecessary except perhaps in parts of Central Otago, where the rainfall is very light.

124. First and foremost New Zealand is a pastoral and grazing country. Over 14,000,000 acres of land there have already been sown down in English grasses, which compare remarkably with the 20,000,000 acres of pasture in an old country like Great Britain. A large proportion of the cultivated land is devoted to the raising of crops to be consumed by stock, such as roots for winter feed, and lucerne and maize for green fodder. Practically no oil cake or other concentrated foodstuff is needed except sometimes meal for calf and pig foods. This gives the New Zealand farmers an enormous advantage over those in the United Kingdom. His land also is, as a rule, of great fertility, although the soil is very varied.

125. The result of these conditions is that prices are paid for land that is easy of access in New Zealand which to the English agriculturist seem astonishing, outpassing as they do the highest figures obtainable in the Mother Country, even for the most favourably situated estates. In certain instances some of this value may be speculative, but in the main it is intrinsic, arising from the gifts of nature. It must be remembered that, in the present development of steam communications, mere distance from the world's great markets makes little difference to the profits of a farmer who has the advantage of freezing works at hand, and of co-operative factories that take milk almost from his gate and return to him the profits of the butter and cheese sold in London or Canada.

126. All these circumstances taken together tend to make farming in New Zealand a very profitable industry notwithstanding the high price of the best land there. Especially is this the case during the present war, when, owing to the keen demand for its meat products, the profits earned by the New Zealand pastoralist are said to be great.

127. In New Zealand, however, as in other of the Dominions, labour is a considerable problem, the cost of hired assistance on the land being high even when it is obtainable. This is one of the reasons which makes New Zealand so suitable a country for small holdings that can be worked by a man and his family without the assistance of outside help. For instance, a Committee of the Commission visited a farm in the neighbourhood of New Plymouth where cows were kept. The owner, a most enterprising man, who made use of milking machines, explained to them that he was careful not to allow these cows to increase beyond a number that could at a pinch be handled by himself, his wife, and a daughter, since the hired hands were liable to depart at any moment, and cows must be milked.

128. The best arable land in the Canterbury Plains covers an area of about 3,000,000 acres; this is the principal grain-growing district in the South Island, and indeed in the Dominion. When compared with Australia, it may here be stated, the average grain yields of New Zealand are very high indeed. Thus, in the season 1914-15, wheat was returned at 28·94 bushels per acre, barley at 32·53 bushels, and oats at 39·77 bushels; these yields were all less than those of the previous year. It is stated officially* that on some of the lands wheat yields up to 80 or 90 bushels per acre and oats up to 100 bushels. Of turnips 70 tons per acre have been taken, and of mangolds on special

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* New Zealand Official Year Book, 1914, p. 572.

lands the weight has reached 90 tons. These last returns are, of course, enormous, even when compared with the best in England.

129. The North Island is in the main a grazing country whereon both sheep and cattle thrive to admiration. One of the cheese factories there is said to be the largest in the world, and the export of butter and cheese from the Dominion, most of which comes from the North Island, had risen from the value of 208,000*l.* in 1890 to the value of 4,903,000*l.* in 1914. In the latter year 434,000 cwt. of butter and 864,000 cwt. of cheese were exported, the great majority of it to the United Kingdom.

LIVE-STOCK AND ITS PRODUCE.

130. In the year 1911, the latest for which figures are available, there were over 400,000 horses, over 2,000,000 cattle, nearly 24,000,000 sheep, and 350,000 pigs in the Dominion. When it is added that in 1858, about 50 years before, there were some 15,000 horses, 137,000 cattle, 1,500,000 sheep, and 40,000 pigs, it will be seen how great has been the increase in half a century.

The great increase in the number of sheep is due largely to the discovery of the possibility of export of frozen carcases. Before this discovery was made, the fleece was practically the only source of revenue to the farmer. Now, millions of sheep and lambs are sent each year to the freezing works, which few official visitors to New Zealand fail to inspect.

131. Wool is New Zealand's leading agricultural product. In 1914, 220,473,000 lbs. were exported of the total value of 9,318,000*l.*, the actual production of the Dominion in the corresponding crop year being 203,346,000 lbs. These are very large figures, but doubtless they will be further increased in the future.

WHEAT.

132. In the case of wheat there was a decrease from 322,000 acres in 1910 to 167,000 acres in 1913, a somewhat remarkable diminution; figures for 1914 show an increase to 229,600 acres. In normal years there is no export of wheat from New Zealand, all the grain grown being used locally or as farm foodstuffs.

OATS.

133. In oats there was a slight decrease in 1914-15, as compared with the preceding year. Most of the oats grown are used locally or for chaffing, ensilage, &c.; some, however, are usually exported, though in some years there is no surplus available for export. Exports therefore vary greatly; in 1913 they amounted to 239,000 bushels, and in 1914 to 1,323,000. In 1912 the amount was 4,124,000 bushels, and in 1909 still more.

FLAX.

134. A peculiar product of New Zealand should also be mentioned: that of *phormium tenax* or wild flax, which mainly grows wild in swampy lands over large areas of the Dominion, the fibre being used for rope making and other purposes. At the Census of 1911 no less than 81 mills were in operation preparing this fibre for the market.

OTHER CROPS.

135. The acreage under barley, maize, and rye is inconsiderable, as is that under beans. In 1914-15, 13,300 acres were under peas, of which crop a good quantity is exported. Of potatoes there were 21,900 acres in 1914-15, the average yield of which was 6·06 tons per acre, as against 2·41 tons in the Commonwealth of Australia for the same year. Of turnips and

rape there were 711,200 acres in 1914-15, with an average yield of 11·75 tons of turnips per acre, which is not heavy. Mangolds, however, in the same year gave a return of 23·69 tons per acre. As we have shown above, however, there are greatly increased yields, both of turnips and mangolds, on special lands.

FRUIT.

136. Fruit-growing is practised with great success in New Zealand, especially at Nelson, in the South Island, and in Central Otago. Of late years it has been discovered in this Dominion and elsewhere that some of the poorer lands, hitherto supposed to be of little value, are really the best for fruit, which requires not a very rich soil, but sunshine to ripen it, and absence of wind to prevent damage while it is approaching maturity.

In 1915 there were nearly 45,000 acres planted as commercial orchards in New Zealand, in addition to 384 acres in vineyards. The fruit industry is increasing rapidly, as is shown by the fact that over 16,000 acres were planted between 1908 and 1915.

There is a growing export trade in apples to South America.

GRASSES.

137. Of the large area of sown English grasses we have already spoken. Of this about 5,000,000 acres were ploughed before sowing. The rest were laid down by scattering the seed upon land off which the bush and fern had been burned.

OWNERSHIP OF LAND.

138. There are still some large estates in New Zealand, 90 occupied holdings being returned in 1911, the last year for which figures are available, as being over 50,000 acres in extent. On the whole, however,

it may be called a country of small holdings, since in the same year there were 56,000 owners of less than 320 acres, and nearly 3,500 of holdings from 321 to 640 acres. It should be remembered that a large extent of New Zealand consists of mountains and lakes. It is not by any means a country with illimitable land that can be cultivated as is the case with the vast continent of Australia. Since, however, the Dominion only has a population of a little over a million, of which probably not more than half dwell upon the land, its agricultural output must be considered remarkable. Indeed, we are tempted to speculate what it would be if that population were even 5,000,000, a number which without doubt it could support with ease. It is part of the policy of this Dominion to bring about the subdivision of large areas, and to encourage closer settlement, so that there may be full utilization of available land.

Union of South Africa.

139. The extraordinary progress of mining for gold and diamonds has, by reason of its greater attractiveness and opportunities for amassing wealth at a more rapid rate, somewhat overshadowed agriculture in South Africa; for the same reason the development of the base metals of the Union has been neglected and progress therein retarded.

Other difficulties, too, have been met with. It must not be overlooked that only 15 years have elapsed since the close of a devastating war, and that, since then, severe droughts have occurred periodically. Furthermore, owing to the conservatism of the farming population generally, the difficulty of inculcating the advantage of scientific cultivation and breeding has been great and the process of assimilation very slow. Whilst well-equipped agricultural establishments came into vogue soon after the War, it was not till 1907 that their influence began to be felt. From thence onwards scientific education has made great strides, and farming has gradually progressed.

140. Undoubtedly South Africa has great opportunities for developing its agricultural and pastoral industries. The climate is as near perfect as possible, being subject to no excessive heat or extreme cold. Unfortunately, the distribution of precipitation is very uneven. While in parts the rainfall is abundant and regular, in others again it is low and uncertain. There is, however, great depth of soil of unsurpassed fertility over a considerable portion of its area, and, if the rainfall be sufficient or irrigation water is available, a good return may be looked upon as assured. Native labour may not be too efficient, but the local supply is at any rate larger and cheaper than in any of the other Dominions. The great drawback in the past has been the multiplicity of pests and diseases, both in plant and animal life; but these have for the most part been overcome, thanks to Sir Arnold Theiler and his associates, whose untiring efforts towards the discovery of remedies have been rewarded with a large measure of success.

141. With the advance of scientific knowledge the advantages of "dipping," as a preventive of many animal diseases, are being generally recognised and appreciated both by European and native farmers. In the past there was a certain slackness in carrying out the provisions of the Dipping Law, but it is now being stringently applied. In particular the efficacy of dipping as a cure for the terrible scourge of East Coast fever has now been fully established, and this disease, which was specially prevalent amongst the cattle in the Northern and Eastern portions of the Union, is now fully under control, and may, it is hoped, be totally eradicated. Similarly, scab amongst sheep has been reduced to a minimum.

142. We remarked in our Third Interim Report that the outlook for the future justified a "guarded optimism."* The development of the South African agricultural and pastoral industries during the last three years amply confirms this forecast.

The Union still has to import foodstuffs which it might well produce itself, but the amount is gradually decreasing. During 1913 the imports of butter, condensed milk, cream, and meat amounted to 1,185,300*l*. Notwithstanding the rise in prices, in 1915 the amount was only 885,600*l*., a reduction of 25 per cent. Similarly, whilst in 1913 there were imports valued at 2,099,000*l*. of wheat, flour, and other cereals, the figures for 1915 were only 1,563,500*l*., again a decrease of 25 per cent. It is gratifying to find that South Africa has now begun the export of meat and eggs to Europe.

WATER CONSERVATION, IRRIGATION, AND LAND SETTLEMENT.

143. A hydrographic survey is being gradually carried out in the Union, and much time and money are being devoted to boring for underground water. Fortunately, this is found at a comparatively shallow depth at many places in the Union; and whilst the flow is not large, the quality of the water is excellent and sufficient to serve the large herds of sheep and cattle on the extensive ranches. This should prove a great stimulus to pastoral pursuits.

Recognising the value of agriculture to the general prosperity of the country, the Government is making every effort to increase agricultural production, and with that view has recently inaugurated large schemes of water conservation for irrigation purposes and for the settlement of suitable settlers, from which great results are expected.

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* P. 39 of [Cd. 7505].

144. Land settlement is also being actively carried on by the Union Government under the Land Settlement Act of 1912 and the principle has been wisely laid down that water must first be provided before land is opened up for settlement.

Since the above Act came into force to the end of 1915, the Government has purchased land to the value of 386,000*l*. on behalf of settlers, and in addition Crown lands valued at 331,000*l*. have been allotted to settlers.

LIVE-STOCK.

145. Perhaps the most promising line of advance lies in the augmentation and improvement of the flocks and herds of the Union. Already within the Empire South Africa stands second only to Australia in its number of cattle and sheep. Further development in this direction is being encouraged by the provisions in the present South African mail contracts for the free carriage of pedigree stock, and in time there should be a large increase both in dairying and other stock.

Sheep do well, and the Union only comes behind Australia and New Zealand as a source of supply of wool to the Mother Country. A new industry has been introduced through the movement into the Union from South West Africa of some "Karacul" sheep which produce a fur known to commerce as "astrakan."

146. In past years South Africa was justly renowned for the hardy character of its horses, and horse-breeding was carried on to a large extent, the trade being encouraged by the Indian military authorities who drew remount supplies from various parts of the Union.

Unfortunately, owing to the appearance of the dreaded disease known as "horse sickness," the breeding of remounts suffered a severe set-back, and the trade went elsewhere.

There is, however, every reason to hope that, as the result of the extensive investigations and experiments which have been carried out by the Research Department at Pretoria, the great success already achieved in immunizing mules will be extended to horses also.

147. In pre-war times the Union was pre-eminent in ostrich farming; amongst animal produce exported, the value of ostrich feathers came next to that of wool. This industry, of course, has seen hard times since the present war, and the rich land at Oudtshoorn, the centre of the industry, is now producing lucerne for export. Doubtless, however, the ostrich industry will revive with the return of more peaceful days.

CEREALS.

148. Wheat does well in some parts of the Union, but the areas for wheat-growing are circumscribed owing to insufficient rainfall and want of sufficient storage of water for irrigation. As to maize, or to give it the local name "mealies," South Africa produces some of the best in the world.

The exports of maize have increased during the last few years, as will be seen from the following figures:—

	Tons.*
1913	11,500
1914	110,000
1915	149,400

There are immense tracts of lands in the Transvaal, the Orange Free State, Natal, and the native territories still available for maize-growing, and with the increase of settlers on the land this industry is capable of the widest expansion.

FRUIT.

149. South Africa, with its varied climate, ranging from the temperate to the almost tropical, with its highlands rising to 6,000 feet above sea level, and with its extensive coast belt, is able to grow to maturity practically every kind of fruit.

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* Of 2,000 lbs.

Fruit culture on a large scale for export is still in its infancy, but every encouragement is being given by the Union Government, both by placing expert knowledge at the disposal of the growers and by providing facilities for cheap railway and sea carriage.

South Africa is fortunate in being able to place its early shipments of choice fruit on the European market at a season of the year when there are few competitors.

OTHER PRODUCTS.

150. The coasts of Natal and Zululand grow excellent sugar-cane and it is believed that cotton in certain districts would flourish on an extended scale. There are other products of importance, such as tobacco, of which a large amount is grown for local consumption in the Cape Province and the Transvaal, and tea. Wattle bark is also exported from Natal in considerable quantities. All these industries are described in some detail in our Third Interim Report.*

Newfoundland.

151. To complete our survey of the agricultural production and capabilities of the self-governing Dominions it is necessary briefly to refer to the Colony of Newfoundland. In this island agriculture is less developed than are fisheries and forestry. Newfoundland is consequently dependent on imports for a large proportion of its foodstuffs. The climatic conditions, and especially the lateness of the spring and the shortness of the summer, render many portions of the island unsuitable for raising cereals and other agricultural produce. The absence of means of communication in the interior has also been a retarding influence. Another difficulty arises from the shortage of labour available for agriculture. The fisheries and mines

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* Pp. 34-8 of [Cd. 7505].

furnish more remunerative fields of employment, and few agriculturists work more land than can be cultivated by their own labour and that of their families. This we regard as the more unfortunate in that about 2,000,000 acres of land are stated to be available for agricultural development in Newfoundland.

152. In spite of these difficulties, however, there is a considerable sheep-raising and cattle-breeding industry in the island. In the neighbourhood of St. John's there are extensive herds and excellent cows, and the Government in recent years has taken steps to improve the stock. There are native pastures of suitable quality in many parts of the island, and especially in the western district of the Colony it is possible to keep sheep in the open throughout the winter with very little artificial shelter.

153. Climatic conditions render wheat-growing very difficult, and it is doubtful whether Newfoundland will ever be able to make itself independent of outside sources of supply of bread-stuffs. Oats can, however, be grown successfully. Considerable quantities of potatoes and turnips are also produced in various parts of the island, and the Agricultural Board has distributed apple trees for cultivation in the west coast districts, portions of which are said to offer conditions as favourable to apple cultivation as the Annapolis Valley in Nova Scotia.

Parts of the Island, also, are well suited for the cultivation of vegetables of all kinds.

MINERAL RESOURCES.

154. In the course of our journeyings we have made careful inquiry as to the mineral resources of the self-governing Dominions, and in every Province or State we have, by oral evidence, by official statistics furnished, and by discussion with Government geologists, officials of the Mines Departments, and others,

gathered a large amount of valuable information on the subject. We gratefully acknowledge the assistance which has been given us by these gentlemen, who have spared themselves no trouble in furnishing us with every item of information which we desired. The particulars which we have received are set out in full detail in the volumes of Evidence. We think it desirable, however, to present in this Report a brief general statement.

Canada.

155. The mineral deposits of Canada are varied in character and especially varied in distribution, but in the aggregate they are very large in respect both of quantity and value.

The particulars which follow relate only to deposits which are being worked or the existence of which has been positively proved, but it may yet be found that these are but a part of a larger whole.

156. Of the vast area of the Dominion nearly a million square miles is absolutely unexplored territory. Portions of this latter area belong to one or other of the Provinces, but the greater part is included in what is known as the North-West Territories.

It is fairly well known that of this unexplored area the northern part of the great plains and the valleys of the Peace and Athabasca Rivers contain a large amount of unoccupied agricultural land, and farmers and ranchers are entering in considerable numbers. As for the rest of this area, there is every reason to believe that it is quite unfit for agricultural purposes. Much of this region is embraced in the watershed of the Mackenzie River and must be developed through its system of waterways, which includes 3,550 miles of natural riverway navigable for steamboats.

Little has been done up to the present to determine what are the mineral resources of this region, and nothing whatever to exploit them. It is known, however, that they include gold, silver, copper, lead, zinc, iron ores, coal, gypsum, salt, oil, and gas, with, in all probability, other metallic and non-metallic products of importance.

157. Placer gold is found in nearly all the streams flowing into the Mackenzie from the west, and already from the upper regions of the Peace River and the Liard River more than a million pounds' worth of gold has been extracted. Lode gold is also known to occur in quartz veins in the neighbourhood of Athabasca Lake, Great Slave Lake, and other localities in this region.

Without going into further retails we may add that copper occurs in the form of copper sulphide near Great Slave Lake; that Esquimaux report immense deposits of native copper in various localities—a statement, however, which remains to be verified—and that ores of nickel and cobalt have recently been found on Athabasca Lake, in rocks similar to those of Sudbury, Ontario.

158. Reference must, however, be made to the indications that a mineral asset of the Mackenzie basin and one of enormous importance, is oil, for it appears from the evidence that here is one of the largest areas of possible oil-bearing country yet unexplored on the face of the earth. It is estimated that the rocks—the Devonian strata—which are believed to be the source of this oil, cover an area of not less than 300,000 square miles.

It is hardly possible to exaggerate the importance of this deposit the exploitation of which cannot be long deferred, for the oil reserves of the United States are estimated by the United States Geological Survey to be sufficient at the present rate of output for only about 30 years and no other part of the North American continent gives such promise of new oilfields as the basin of the Mackenzie River.

159. In these circumstances it seems desirable, and even urgent, that a complete survey of this region should be made as early as possible. When the Dominion Government resolves that the work should be done, the high technical ability of the executive officers of the Mines Department will assure its execution.

160. What follows relates to past and present output.

Of the total mineral production of the Dominion in 1915 (the last year for which figures are available) coal represents 23·4 per cent. of the value of the whole, nickel 14·9 per cent., copper 13·8 per cent., gold 12·7 per cent., silver 9·6 per cent., cement 5·1 per cent., clay products 2·9 per cent., stone quarries 3·1 per cent., natural gas 2·7 per cent., and asbestos 2·6 per cent., the balance being made up of small outputs of other minerals which need not be detailed.

The distribution of the total production for 1915 among the Provinces was as follows:—

	Per cent.
Ontario	44·54
British Columbia	20·92
Nova Scotia	13·19
Quebec	8·48
Alberta	7·23
Yukon District	3·69
Manitoba	0·96
New Brunswick	0·66
Saskatchewan	0·33
Total	100·00

For many years British Columbia was the leading mineral-producing Province of Canada, but since the discovery of gold at Porcupine, silver at Cobalt, and nickel at Sudbury, it has had to yield pride of place to Ontario.

Details are as follows, and while they set forth realised facts and the indications of prolonged production, it is important not to overlook the potentialities of the great North-West Territories, to which reference has already been made.

GOLD.

161. Gold is now being produced in Ontario, British Columbia, the Yukon District, Nova Scotia, Quebec, and Alberta. Of these, however, only the three former districts are of any importance, their production representing, as it does, over 99 per cent. of the total value.

162. The production of gold in Canada began in British Columbia about 60 years ago, and attracted a large population. The alluvial diggings which were first discovered were, in the course of years, exhausted, but fresh discoveries of the same nature have repeatedly been made, while lode mining has become a very important industry. There are abundant reasons for believing that the production of gold in the Province will continue for many years to come.

163. Recent discoveries have made Ontario the largest gold-producing Province in the Dominion.

Gold had been mined in various parts of Ontario for many years, but neither in quantity raised nor in profits earned were the results other than very moderate until the discovery of the gold deposits in the Porcupine district in 1909. This discovery was, in a sense, the result of the development of the silver mines at Cobalt. The success of these mines led prospectors to search for similar deposits in other likely parts of the Province, and, in their search, they found not silver but gold.

It is estimated that the district contains an auriferous area of forty to fifty square miles, but, of course, the veins are not continuous, and so far the richest are those in the immediate vicinity of Porcupine.

The methods of working the existing mines, the extent of development, the depths at which the ore continues to be found by drilling, and the numbers employed, are set forth in memoranda supplied to us and recorded in the evidence.*

We are satisfied from all we saw and heard that very much more gold is in sight at all the mines than has yet been extracted, apart altogether from the gold the existence of which has been proved by diamond drilling far below the deepest of the existing shafts. It may, therefore, be confidently stated that the Porcupine field has before it a long and prosperous life and Canada a most valuable asset. No better proof of this could be found than in the fact that, apart from the shafts being sunk by new companies which have as yet no records, the present companies are all spending very large sums in developments and extensions by which they expect to increase their output by from 50 to 100 per cent.

164. The Yukon Territory became famous for its gold production in the last years of the nineteenth century owing to the rush of gold seekers to the Klondyke region. Its greatest production was in the year 1900, after which there was a steady decrease until 1907. Since that year there has been some improvement through the introduction of better machinery.

165. Gold is largely found in combination with other ores, and a considerable proportion of the total yield is recovered from this source.

SILVER.

166. Of total production of silver much the largest proportion is produced in Ontario, though a considerable amount comes from British Columbia, and a small balance from the Yukon and Quebec.

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* [Cd. 8459] p. 306.

Practically the whole of the Ontario output is found in the Cobalt district and the vicinity. The ore was first discovered in 1903, during the construction of the Temiskaming and Northern Ontario Railway, and after examination and analysis by experts was found to contain silver, cobalt, nickel, and arsenic. Production began in 1904. The year of greatest production was 1911. Since then the amount has gradually declined.

167. Hitherto about five ounces of silver per ton of ore have been lost in the tailings, but a system of recovery by oil flotation has just been introduced, by which it is expected that 4½ of the 5 ozs. will be recovered, leaving only half an ounce of silver per ton of ore irretrievably lost. This represents a large amount to be recovered from the tailings hitherto regarded as worthless, which probably amount to at least a million tons, and it will further permit of the working of a lower grade of ore than it has hitherto been profitable to handle.

168. It has not been found possible to make any useful estimate either of the amount of the proved ores or of the extent of the field, mainly because of the wide and irregular distribution of the ores and of the extraordinary variations in their value. Some ores yield not more than ten ounces of silver per ton, some as much as ten thousand ounces.

169. In the early years of the Cobalt camp all the ore raised at Cobalt had to be sent out of the country for treatment, mostly to the United States. Now, however, 84 per cent. of all the silver produced is converted into bullion in Canada. The remaining 16 per cent., which still goes to the United States, consists mainly of low-grade material, which is in demand as a flux by United States smelters.

COPPER.

170. Of the production of copper somewhat more than half is to be credited to British Columbia, and

of the remainder nearly all comes from Ontario, though small percentages are derived from Quebec and the Yukon district.

The yield in Ontario is mainly derived from the nickel-copper ores of Sudbury, with which we have dealt in detail elsewhere.

The production of British Columbia is increasing rapidly, and we found everywhere among experts in this Province a conviction that this increase will continue; this conviction, they consider, is justified by the results of systematic exploration steadily maintained. In Ontario also the increasing output of nickel ores involves an increased yield of copper, so that Canada will undoubtedly make a large contribution to the world's supply of the metal.

LEAD.

171. Lead is produced in British Columbia, the Yukon, Ontario, and Quebec, but the yield in all but the first-named Province is at present quite unimportant; British Columbia already produces more than 95 per cent. of the total for the Dominion, and the amount, already over 20,000 tons per annum, is growing rapidly and is certain to increase.

ZINC.

172. In 1915 British Columbia produced 14,900 tons of zinc ore, and Quebec a few hundred tons. These figures, however, must not be taken as indicating in any way the extent of the country's deposits of the metal. The ores are often very refractory, and these have hitherto been neglected because of the difficulty of separating them from the lead with which they were combined. This difficulty has now been overcome by the process worked out by the Consolidated Mining and Smelting Co. at Trail, which is fully

described in the Notes of Evidence which we took in Canada,* and there will certainly be a large increase in the production of zinc in future years.

NICKEL.

173. So much has been said about nickel in our Fifth Interim Report and in the Minutes of Evidence taken in Canada and notes thereon,† that it is hardly necessary to add much here. The production is growing very rapidly, and the importance of this great asset can hardly be exaggerated. It represents, in combination with the much smaller output of New Caledonia, a virtual monopoly of a metal which is becoming of ever-increasing importance in the national industries, and is an absolute necessity in the production of satisfactory war material.

When we arrived in Canada our information led us to the conclusion that the proved reserves of ore containing on an average 3½ per cent. of nickel and 1½ to 2 per cent. of copper were not less than 70,000,000 tons. But developments have been so rapid that before we left we had reason to think that the reserves may be found to be not much less than double this amount. However, the Report of the Ontario Nickel Commission presided over by Mr. G. T. Holloway may be expected at an early date, and all the known facts will then be submitted on the highest authority. All this is, of course, exclusive of what may yet be found in the North-West.

COAL.

174. The coal deposits of Canada are enormous, amounting, according to estimates prepared for the world's Geological Congress which met at Montreal in

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* [Cd. 8459] p. 271.

† *See* [Cd. 8457] p. 45-6 and [Cd. 8459] pp. 297-303.

1913, to one-seventh of the world's known supplies—the estimate for Alberta alone being over a million million tons.

A very large proportion of this great total, however, is lignite or lignitic, and the amount of this quality now raised is the merest scratching of the surface of these deposits. Meanwhile, coal is being imported from the United States into the Provinces which possess this enormous wealth of fuel. Careful thought and study and scientific research are being devoted to the ascertainment of the best means of utilising this lignite for developing power and for domestic purposes.

175. The best coal is found in the east and the west, that is, in Nova Scotia, Western Alberta, and British Columbia. None is raised in Quebec, Ontario, or Manitoba, but a little is produced in the Yukon.

Nova Scotia's coal is of excellent quality and so abundant that a greatly increased demand could be satisfied for many hundreds of years. It is used in the iron and steel works of Sydney; it supplies the requirements, industrial and domestic, of the Maritime Provinces and of part of the Province of Quebec, while a considerable amount is sold for ships' bunkering and also for shipment out of the Dominion. Fully half of the coal now raised in Alberta is bituminous; there is a small production of anthracite, the rest lignite or lignitic. British Columbia's coal is of good quality, being mainly bituminous or semi-anthracite. In this Province there are enormous deposits of fine quality which can be easily and cheaply developed as soon as the demand calls for this.

IRON.

176. The iron ores of Canada, so far as these are yet known, cannot be said to be equal in extent to the ultimate, or even to the immediate, requirements of the country.

Of deposits on which considerable development has been done it is estimated that there may be 200,000,000 tons and in addition large deposits are known to occur in British Columbia, both on the mainland and in the islands bordering on the coast. In our Fifth Interim Report we have dealt more in detail with the British Columbia iron ores, and have suggested certain preliminary measures towards development.* But it must be granted that a very large proportion of the ores consists of magnetite, and many of them are impregnated with sulphides to an extent which makes them at present unattractive to iron and steel operators.

It is quite possible that large deposits with a reasonably low sulphur content may exist, but with our present knowledge we must admit that the outlook is much less satisfactory than it is south of the boundary line. Fifteen or twenty years ago it was confidently expected that in portions of Ontario, particularly in the area north of Lake Superior, there would be found hematite deposits similar to those in the adjacent States of Minnesota and Michigan. The exploration done up to now has resulted in the discovery of only one workable deposit, and this is now exhausted.

There are, however, in Ontario large deposits of low-grade ores in the form of banded magnetites and siderites.

It is also known that low-grade bedded ores occur plentifully along the east coast of Hudson Bay. The existence here of high-grade deposits has not yet been established, but prospectors have recently returned from this area with attractive samples. For instance, we had submitted to us in Quebec particulars and analyses of an immense deposit of ore in the Hudson Bay area, which appeared to have only one fault, viz., the extraordinary amount of silica it contains, there being on an average quite as much of this as of metallic iron in the numerous samples analysed.

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* [Cd. 8457] pp. 47–8.

Meanwhile the manufacture of pig iron in Canada is carried on mainly with imported ores.

MOLYBDENUM.

177. The production of molybdenum is increasing very rapidly. Fresh discoveries of ore are frequently made, and the production is likely to be largely increased—a matter for congratulation at a time when this metal has become one of the most valuable.

OTHER METALLIC ORES.

178. Other metallic ores produced in Canada are antimony, cobalt, and platinum. There is an important production of aluminium at Shawinigan Falls, but this is from imported ores.

ASBESTOS.

179. Of non-metallic minerals, apart from coal and natural gas, asbestos takes the first place both in value and importance.

As in the case of nickel, Canada is markedly predominant in its possession of asbestos. We have dealt at some length with the position and prospects of the industry in our Fifth Interim Report.*

Here we need only say that this mineral is found in abundance in the serpentine rocks of Quebec, and, as it is indestructible either by fire or by acids, the demand is constantly and steadily increasing. The deposits have been proved to be very extensive and the supply is only limited by the lack of available labour. It is woven into textile cloth, and is used for roofing, shingles, slates, the partition walls of houses, and wherever a certain protection against fire is wanted. Canada's present production is equal to 80 to 85 per cent. of that of the whole world, and while it is scarcely possible to estimate the whole supplies available, it can hardly be doubted that these will enable the Dominion to maintain her present premier position for a very long time to come.

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* *See* [Cd. 8457] pp. 46–7.

NATURAL GAS.

180. Natural gas has, so far, been found in Ontario, Alberta, and New Brunswick, but prospectors are regularly at work in these Provinces and elsewhere in the Dominion, with indications that the production may yet be largely increased.

PETROLEUM.

181. The flow of the oil wells which have been sunk throughout the Dominion has almost, without exception, shown such a marked falling-off in recent years that unless new fields are found it seems as if the industry were doomed to extinction at a comparatively early date. Prospectors are, however, at work at every likely area, and what has been said as to the probability of a great yield in the North-West renders a survey of this territory a matter of capital importance.

There is good reason to believe that there are large areas of bituminous shale in the Eastern Provinces, and especially in New Brunswick. Numerous distillation tests have been made both in laboratories and on a commercial scale with most satisfactory results. Sir Boverton Redwood has reported on this field, and though his report has not been shown to us, the Dominion Government may think it worth while to call for it.

PEAT.

182. There are immense peat bogs in various parts of the Dominion, and numerous efforts have been made to prepare the peat for utilisation as fuel, but as yet with no marked success.

GYPSUM.

183. There are large deposits of gypsum in Ontario, New Brunswick and Nova Scotia, the production being about half a million tons a year. Some of it is calcined and converted into plaster in the neighbourhood where it is raised, but the greater part is sent to the United States in its crude form to be converted there. As the people of Canada have to buy it back in the form of plaster at a greatly enhanced price, there would seem to be no sufficient reason for the continuance of this state of affairs.

OTHER NON-METALLIC MINERALS.

184. Other non-metallic minerals produced in Canada are arsenic, chromite, corundum, feldspar, graphite, grindstones, magnesite, manganese, mica, mineral pigments, mineral waters, phosphate, pyrites, quartz, salt, talc, tripolite, building stone and slates. Clay of excellent quality is found in all the Provinces, and there seems to be no reason why the imports of clay products, which have been decreasing year by year, should not altogether cease. The production of clay products in Canada has recently shown considerable reduction, but this is to be attributed solely to the suspension of building operations following on the outbreak of war, which also accounted for a considerable falling off in the production of cement, an industry, however, capable of great expansion and likely to have an important future.

In Quebec there is a valuable deposit of kaolin, which is regularly worked.

LOCAL REFINING.

185. Hitherto no copper or nickel has been refined in Canada, the blister copper and nickel-copper matte produced by the smelters having been sent mainly to the United States for final treatment.

We were glad to learn, however, that a copper refinery was started at Trail in British Columbia in August 1916, and has since been operated with complete success. The same company which owns this refinery refines lead; and fine gold, fine silver, copper sulphate, and antimony are recovered from the residues.

We also understand that the Dominion Government are arranging with the Canadian Copper Company, which is American-owned, and at present sends the whole of its nickel matte to New Jersey for refining there, to have a proportion of this refined in Canada, while the British American Nickel Corporation, which is on the point of beginning operations, will treat the whole of its nickel to a conclusion in the Dominion.

From the Cobalt district ores there are recovered locally, in addition to silver bullion, arsenic, nickel, and cobalt in various forms.

OWNERSHIP OF CANADIAN MINES.

186. In the course of our enquiries the ownership of Canadian mines was frequently brought to our notice, and it is certainly regrettable that this great Canadian asset should be so largely owned outside the Empire. Canada's mineral wealth had, of course, to be developed. If she had not the necessary capital herself it had to be found elsewhere, and those who took the risk involved are entitled to the profit. But the situation as it has developed is hardly creditable to the enterprise or the foresight of British capitalists. We were repeatedly told in Canada that some of these had from time to time sent out their engineers and

surveyors for the purpose of surveying and making enquiry, but that these gentlemen in very many cases declined to avail themselves of local knowledge, and acted on their own conclusions, with results often disastrous to their employers and prejudicial to the interests of Canada. Whatever truth there may be in all this, we hope that British capital may be adequately represented in the coming development of Canada generally, and particularly of the North-West.

187. One possible result of the present condition of things might be this. If it be true, as we have been assured, that most of Canada's copper is controlled by those who regulate the United States production, it is quite conceivable that, if restriction of output were considered advisable, a commencement might be made with the Canadian mines, with consequent paralysis of an important industry and infliction of great hardship on a large body of workmen and their dependents. Of course this would not occur if by the terms of the leases forfeiture thereof followed any wilful abstention from working, or if provision should be made in the Provincial or Dominion Mining Laws empowering the Governments to take over the working of any mine when the owners cease to work it or restrict its output without satisfactory cause having been shown for their action. Such a provision is in operation in the Union of South Africa.

VALUE OF UNIVERSITIES IN CONNECTION WITH MINING WORK.

188. McGill University in Montreal, the University of Toronto, and Queen's University, Kingston, are all well equipped for the teaching of geology, mineralogy, and metallurgy, and year by year send out graduates, many of whom have become famous in their professions. These Universities, and indeed all the other Universities in Canada whose mineral departments we had the opportunity of seeing, are devoting to scientific research

such limited means as are at their disposal, and no more patriotic act, or one more fruitful of ultimate good, could be done by the wealthy men of the Dominion than to follow the example of those eminent Canadians whose wise benefactions have done so much to raise their Universities to the position they now occupy.

GOVERNMENT INCOME FROM MINING.

189. We may add that the present income received by the various Governments from the mineral wealth of the country—a most valuable but ever wasting asset—appears to us to be wholly inadequate. The taxation is quite insignificant in comparison, for example, with that levied in the Union of South Africa; and the special tax recently imposed by the Dominion Government on mining and other profits,* is a war tax and will, we presume, end with the war.

Australia.

190. It is interesting and important to note that practically every mineral of commercial value is found in Australia. While the figures which are given as to the amount and value of the minerals recovered are, no doubt, practically accurate, it is necessary to point out that those which relate to potential future yields can in no sense be regarded as final. While the geological survey of the older States is fairly, but by no means fully, complete, this cannot possibly be said of the others. For instance, Queensland, which may prove to be the richest of all the States in mineral wealth, has an area of 670,000 square miles, and its Government Geological Staff at the time of our visit numbered only five.† A somewhat similar condition of things prevailed in Western Australia (though the

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* 6 & 7 Geo. 5. c. 11.

† Dunstan, Q. 10,986, p. 169 of [Cd. 7172].

geological staff numbered twenty),* while in the Northern Territory a geological survey had hardly even been begun. All parts of the Commonwealth have necessarily many claims on their revenues, some of them extremely urgent, but in view of a more rapid development of the country it is most desirable that this survey should be accelerated and extended as widely and rapidly as the finances will allow.

GOLD.

191. The history of the discovery of gold in Australia more than sixty years ago is too well known to require recapitulation here. As elsewhere, it attracted a large population, whose presence in the country hastened an agricultural and industrial development which might otherwise have been delayed for many years.

There are now few alluvial diggings in Australia, but the quartz reefs, which are regularly and systematically worked in the States of Victoria and New South Wales, provide a very substantial contribution to the Commonwealth yield. There is also a moderate amount of gold produced year by year in Tasmania. The State which at present produces the largest amount of gold is Western Australia. Its history as a gold-producing State and the prospects of the industry are specially referred to in a memorandum published with the evidence which we received in Australia.†

In Queensland there has been of recent years a large reduction in the amount of gold obtained from mines—the Mount Morgan mine, for instance, which in its day was one of the richest gold mines in the world, being now a copper mine. But the copper ore extracted from this mine, as is shown below, is largely impregnated with gold.

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* Maitland, Q. 11,298, p. 183 of [Cd. 7172].

† Pp. 194–5 of [Cd. 7172].

SILVER.

192. We have not been informed if any purely silver mines exist in Australia, but the lead ores in many parts of the country, especially at Broken Hill and in Tasmania, are impregnated with silver to an extent which greatly increases their value.

COPPER.

193. Copper is found in all the States of the Commonwealth, but the principal sources of supply are at the present moment the Mount Lyell mine in Tasmania, the Mount Morgan mine in Queensland, the Wallaroo mines in South Australia, and the Great Cobar mine in New South Wales. In the two former the copper ore contains a very considerable percentage of gold and a smaller percentage of silver. This is recovered in the final process of refining, and in the case of the Mount Morgan copper the gold recovered is nearly equal in value to the copper which remains, estimated at the average price of copper over a series of years.*

The annual tonnage of copper produced in the Commonwealth is very considerable, but it is insignificant compared with what exists and could be produced if adequate transport facilities were provided. In the Cloncurry district of Queensland enormous deposits of very rich copper ore are known to exist over an area of several thousand square miles.† Much of this ore is extraordinarily rich, containing as it does, 12 to 20 and even, in some cases, as much as 30 per cent. of copper,‡ and there can hardly be any doubt that potentially this is the greatest copper field at present known. The importance of copper in civil and military industries and in the arts is well understood. The present world's supply under normal conditions at times approximates so closely to the demand that violent fluctuations in price are not unusual, with consequent disturbance of trade.

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* *See* p. 190 of [Cd. 7172].

† Ball, Q. 11,058, p. 173 of [Cd. 7172].

‡ *Id.*, Q. 11,053 ff., p. 172 of [Cd. 7172].

The consumption of copper in the United Kingdom is very high and it is well worth the consideration of large consumers whether it would not be in their interest to contribute in any way open to them to the development of the Cloncurry field.

LEAD AND ZINC.

194. Frequent reference is made in the evidence already published and in various accompanying memoranda to the silver-lead mines of the Commonwealth, especially to those at Broken Hill in New South Wales and at Zeehan in Tasmania.* Those at Broken Hill are the largest of the kind in the world. They afford a remarkable instance of successful industrial development, and the companies there are confident that they will be able to maintain their predominant position for many years to come.

Even at the time of our visit, a year before the outbreak of war, we formed the opinion that the shipment of a very large proportion of the silver-lead and zinc concentrates to Europe, coincident as it was with increased imports into Australia from countries such as Germany,† was deserving of special attention. Events since have more than confirmed this view and have, as the world knows, necessitated drastic action on the part of the Commonwealth Government to free Australia from German control of the lead and zinc industries. A special company has now been formed amongst the Broken Hill Companies to smelt the whole output of silver-lead concentrates at Port Pirie. Even now, however, there is a doubt whether there will be established either in Australia, the United Kingdom, or Allied countries plant adequate to treat the whole output of zinc concentrates.

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* P. 174 and pp. 191–3 of [Cd. 7172].

† *See* especially p. 193 of [Cd. 7172].

TIN.

195. Tin is found in every State in the Commonwealth, but the largest supplies have hitherto been obtained from Tasmania and Queensland. The Mount Bischoff mine in Tasmania has hitherto overshadowed all others in the island, but new mines are being opened up, the prospects of which are very promising.* Recently a new lode of great extent was discovered at Ardlethan in New South Wales,† and its prospects are regarded very favourably.

IRON.

196. Iron ores, many of them of very excellent quality, are found in all the States of the Commonwealth, but in many cases their scattered distribution and their geographical position would, in present conditions, make them too costly to work even where they are not inaccessible. There are, however, several outstanding exceptions, the most noteworthy of which are the Iron Knob and the Iron Monarch in South Australia, and the Blythe River field in Tasmania. The former, which may be described as mountains of solid iron ore, belong to the Broken Hill Proprietary Company. The ore is of excellent quality. Much of it appears on analysis to be suitable for the manufacture of the highest class of steel. Until the past few years it was used solely as a flux at the Company's works at Port Pirie. Since 1913, however, steps have been taken to utilize part of the output for conversion

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* P. 191 of [Cd. 7172].

† P. 194 of [Cd. 7172].

into pig-iron and thereafter into steel at the works erected by the Company at Newcastle, New South Wales.

The ore contents of these two mountains are so enormous that even if the Company were hereafter to supply the whole of the requirements of Australia they would not be exhausted in many generations. If the Company were disposed to sell any of the ore in the United Kingdom it would find a ready market there if reasonable terms of freight could be arranged.

The Blythe River ore in Tasmania does not appear on analysis to be quite so good, but it is nevertheless an excellent ore. One difficulty in utilising it is that, owing to geographical considerations, the Broken Hill Company will have a great advantage in supplying the needs of the Australian continent. But if the Blythe River ore cannot be shipped to Europe it might be converted into pig-iron, for which a market could probably be found in the United Kingdom.

COAL.

197. Along with this great mineral wealth there are enormous deposits of coal throughout the Commonwealth, but, unfortunately, it is not very evenly distributed. South Australia has very little; in Western Australia the quantity discovered so far is not large and the quality is poor, while nothing is known of what the Northern Territory may contain. In Victoria it has hitherto been thought that the supply was small, but quite recently it has been ascertained that there are immense deposits of brown coal, which, while hardly suitable for domestic purposes and not very good for industrial purposes, seem well adapted for the production of gas for heating and power.*

There are large deposits of good coal in various parts of Queensland and also in Tasmania, but the coal area of New South Wales is, in respect both of quantity and quality, far in excess of that of any other part of the Commonwealth. There is a large export trade in New South Wales coal from Newcastle, which, we hope, will continue to grow, because, so far as it is possible to forecast the industrial conditions of the future, coal will remain in Australia in superabundant supply.

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* P. 186 of [Cd. 7172].

OTHER MINERALS.

198. There are no oil wells worked in the Commonwealth, but in some shale fields in Tasmania distillation is in progress,* and there are facilities for similar work in other States.

A deposit of nickel ore has recently been opened up in Tasmania,† and the quality is so good that we think it deserves the attention of steel-makers in the United Kingdom.

The evidence which we have taken will give full information as to the other minerals found in Australia which are not referred to here. Of these we would mention specially wolfram and molybdenite, whose importance in the manufacture of munitions of war caused the whole of the Australian output to be bought up by Your Majesty's Government at a comparatively early period in the present hostilities. We may add that it appears to us regrettable that the trade in wolfram and molybdenite and in Queensland opals and other gems should have been neglected by home buyers before the war and valuable business thus allowed to pass into the hands of foreign competitors.

New Zealand.

199. The mineral products of New Zealand are less varied in character than those of Australia, and, relatively to mineralised area, are also less valuable.

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* Twelvetrees, p. 177 of [Cd. 7172].

† P. 191 of [Cd. 7172].

The geological survey of the islands is fairly complete, and it is believed by those most competent to judge that not a great deal remains to be discovered. Apart from small quantities of copper, antimony, silver, manganese, mercury, platinum, and tungsten (scheelite), the mineral wealth of the country is contained in its gold, iron, and coal. We may call special attention, however, to the value of the scheelite deposits. The necessities of war resulted in the purchase of the entire output by Your Majesty's Government on lines similar to those adopted in the case of wolfram and molybdenite in Australia to which we have referred above.

GOLD.

200. Large quantities of gold have been produced from the mines in the Waihi district in the North Island. For many years the Waihi mine paid very large dividends to its shareholders, but latterly its yield has materially diminished. Nevertheless, it is likely to continue to be a fairly productive mine for a good many years to come, and there is always the possibility of exploration revealing fresh lodes.

IRON.

201. There are many deposits of iron ore throughout the islands; but the only one of any real magnitude is at Parapara on the west coast of the North Island. Its contents have been variously estimated, but the total is undoubtedly very large. The ore is of good quality, suitable for foundry purposes and for making basic steel, but the requirements of the New Zealand market would not at present justify the outlay necessary for conversion into steel. It was suggested to us that a market could be found for the ore in Japan,*

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* Park, Q. 2968, p. 189 of [Cd. 7170].

and we are of opinion that it would be in the interest of New Zealand that it should be exported to as many markets as possible in order that its quality should be thoroughly tested. It would be welcomed in the United Kingdom, but we fear that the cost of freight would render shipment there impossible.

202. New Zealand has an asset of great potential value in the iron sands on the west coast. The metallic iron contained is virtually free from deleterious ingredients and the supply is practically inexhaustible. But to convey it to any distance in its present form would be very costly, while its conversion would, in all probability, involve treatment in electric furnaces. This asset is, however, essentially so valuable that it is not likely to remain permanently neglected.

In point of fact we have learned that, towards the end of 1916, a beginning was made with the utilization of these sands by combining them with powdered coking coal, and making them into briquettes suitable for conversion in blast furnaces. The promoters are most hopeful of success, and as their scheme seems perfectly practicable, much interest will be taken in its further developments.

COAL.

203. The extent of the coal measures in New Zealand has been carefully estimated, and the professional advisers of the Government are of the opinion that the available quantity is accurately known. The proved deposits amount, in round figures, to a thousand million tons,* of which three-fourths, under present conditions, are not likely to be mined. The best coal, which is found in the Westport and Greymouth districts, is bituminous and is used for domestic and marine purposes and for shipment. The Admiralty

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* Morgan, Q. 3046, p. 193 of [Cd. 7170].

obtains supplies of coal regularly from the Westport Mines. It is perhaps fortunate that the present consumption is small, inasmuch as the whole quantity of good proved coal in New Zealand is only equal to a year's output in the British Isles. From the nature of the coal the wastage is very great, and as any marked industrial development would greatly increase the consumption it has been suggested that the better coal should be reserved for State purposes and for the needs of the Navy. The matter is one for the New Zealand Government to determine, but there may perhaps be the less hesitation in adopting it because New Zealand is in a position to dispense with coal for all industrial purposes and even probably for the working of its railways by the utilisation of its altogether extraordinary water power. This asset, with which we deal in more detail in paragraphs 308-9 of this Report, is one the value of which it would be difficult to exaggerate.

There has been a small yield of bituminous and semi-anthracite coal from the Paparoa mine at Greymouth, which, we were told, was tried by the Admiralty with satisfactory results. Some of this coal has, for experimental purposes, been converted into coke, and the New Zealand Government analyst reported on it most favourably.

A sample of this coke was sent home to us and carefully analysed and tested, and it was found to be in no way inferior to the best coke on the British market.

OIL.

204. Several witnesses made representations to the Commission to the effect that large supplies of oil were available in different fields throughout New Zealand, and a Committee of the Commission visited the Taranaki oil-field, the best known, and said to be the most promising. A refinery has been erected capable

of dealing with 10,000 gallons per day,* but the quantity produced was, up to the date of the Committee's visit, and appears still to be, entirely inadequate to keep the refinery working. The oil produced is of unusually good quality, and we express the hope that the boring operations in progress will result in a yield that will provide an adequate return for the expenditure incurred.

Union of South Africa.

205. The extraordinary production of gold and diamonds in South Africa during the last 25 or 30 years has almost inevitably monopolized attention. The gold produced formed a most welcome addition to the world's supply of the international medium of exchange at a time when the increasing business of the world rendered a larger supply of gold extremely desirable, and world-wide interest has, in consequence, centred in this industry.

On the other hand, the labour required for the enormous output of gold and diamonds has brought together in various parts of the country, but principally in the Witwatersrand, several hundred thousand natives, partly from Portuguese East Africa but mainly from the Union and the British Protectorates. The racial and social questions arising from this state of affairs have claimed, and still claim, the best energies of those responsible for the government of the Union. The great value of this production has also tended to divert attention from the other mineral resources of the country of which, until quite recently, very little was known. This lack of knowledge is to some extent accounted for by the fact that, up till now, only about one quarter of the area of the Union has been geologically surveyed. But this survey, coupled with the discoveries of prospectors and of casual visitors, has shown that the whole of the Union is largely mineralised, while in the Transvaal the mineral wealth is so great that as yet its extent can only be guessed at. It must, therefore, be borne in mind that where figures are given they are in many cases no more than approximate, and that, until an official survey is completed, no more can be said than that in respect of many minerals their extent is simply enormous.

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* **Morgan, Q. 3064, p. 194 of [Cd. 7170].**

GOLD.

206. We have dealt fully in our Third Interim Report* with the conditions of the gold mining industry, and need only recapitulate here the main features of the position.

Gold was found in small quantities in various parts of South Africa before its discovery in the Rand about 1886, but the developments there have completely overshadowed that of all other districts combined. The amount produced in the Transvaal has grown from year to year until in 1912, and again in 1915, it reached a maximum of over 38,000,000*l.* sterling, and the total production of the Rand from the beginning up to the latest date for which figures are available amounted to 475,000,000*l.*† In estimating the future gold production of South Africa, present information restricts us to consideration only of the probable production of the Rand. It is believed, on data which have been carefully examined and checked, that there remained in the present working mines in 1914 about 550 million tons of payable ore, which was more than double the amount which had up to then been raised. The value of the gold contents of this ore is, of course, unknown. It is further believed that there is an equal quantity of ore in the East Rand not yet exploited, and that at least one-third of this area contains payable rock in veins extending to an unknown depth. It is certain, therefore, that while some mines now being worked may ere long become exhausted the Rand as a whole has before it many years of production and profitable life, and will continue to make a steady contribution on a large scale to the world's supply of gold.

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* Pp. 12 *ff.* of [Cd. 7505].

† Union of South Africa, Department of Mines and Industries. Annual Report for Year 1915. [U.G. 37/16], p. 28.

We would, however, urge again, in confirmation of the opinions expressed in our Third Interim Report, the immense importance of the early development of the East Rand area. We are glad to observe, from recent South African reports,* that the Union Government is taking steps in this direction.

DIAMONDS.

207. Diamonds are found in three Provinces namely the Cape, the Transvaal and the Orange Free State, but while there are probably some twenty mines producing diamonds in various parts of the country the output is mainly sustained from three great sources, the De Beers mines at Kimberley, the Premier mine near Pretoria, and the Jagersfontein mine. It is estimated that, including the production in South-West Africa (about 11 per cent.), at least 95 per cent. of the world's production is now to be found in territories under the administration of the Union Government. It is very probable that other districts in South Africa may be found to be diamondiferous, and, however this may be, it is certain that the production of the existing mines in the Union will continue for many years to come.

COAL.

208. Coal is found in all the Provinces, but the main sources of supply are in Natal and the Transvaal, and extensions of output are certain in these two Provinces while the quantity available for future production in

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* U.G. No 29 of 1916.

the other two Provinces is believed to be somewhat limited. The output in the Transvaal in 1915 was about 5¼ million tons and in Natal about 2¼ million tons,* and in both cases large quantities are sold for bunkering in the different ports of the Union. There is also a fair amount shipped for export to Eastern and South American ports—a trade which it is hoped will be still further extended, and, of course, large quantities are used at the mines, by the Railway Administration and at the different industrial works throughout the Union. But these figures of production are utterly insignificant in comparison with the actual existing deposits which have been estimated to amount in the Transvaal to 36,000 million tons, in Natal and Zululand to 15,400 million tons, and in the Orange Free State, Cape, and Protectorate to 4,800 million tons—or a total of 56,200 million tons, apart altogether from what may be discovered as the geological survey is extended. Of this it is believed that 55 per cent. is workable: the quality is variable, the ash varying from 6 to 30 per cent. with an average of about 10 per cent. An enormous proportion of this coal is, of course, at present inaccessible, but undoubtedly railways will be provided as soon as it becomes profitable to work the seams, and meanwhile it is obvious that one of the essential elements of industrial enterprise exists in superabundance.

IRON.

209. No iron ore has yet been worked in South Africa, but the existence of very large deposits in various parts of the Union is known. The Orange Free State is believed to contain none; what has been found in Natal is poor in quality and not very promising. There are numerous deposits in the Cape Province of various qualities some of them being of the finest

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* Of 2,000 lbs. in each case.

hematite with very small percentages of impurities. The deposits in the Transvaal are enormous in quantity and very varied in quality. Much of the Transvaal ore unfortunately contains a very high percentage of titanium, but there are large lodes of very excellent quality about 40 to 50 miles from Pretoria and the extent and quality of the ore in the Western districts can at present hardly be guessed at. There is, however, enough in various parts of the Union of the very finest quality, together with that in Australia to which we have already alluded, to deserve the immediate and earnest consideration of British manufacturers who regard with anxiety the prospective exhaustion of the high class ores in Spain. Some of these fields are either in touch with existing railways or a line could be carried to them at no great cost. If, therefore, the transport costs could be arranged on a basis which would make shipment possible to Great Britain, there need be no apprehensions as to the magnitude of the supplies available. We venture to suggest that it would be worth while for consumers in Great Britain to ship enough of the ores to ensure adequate and exhaustive trials and, should these prove satisfactory, they might then consider the expediency of erecting blast furnaces and ship home the pig iron produced. In some cases coal and limestone are to be found in close proximity to the iron ore, in others the existence of these has not yet been determined, but in all probability a search would prove successful in most districts. Coal is very cheap and is carried long distances by the Government railways at low rates.

COPPER.

210. There were at the time of our visit in 1914 only three copper producing mines in South Africa, the Cape Copper Company's and the Namaqua Company's, both in Namaqualand in the Cape Province, and the Messina Company's in the North Transvaal. The

Cape Company's is a well-known mine which has been in operation for 50 years and the original company and the present company together have paid in dividends over four millions sterling. The Namaqua Company is also a profitable mine, the dividends of 1913 amounting in all to 37½ per cent. Both mines work a limited area in an extensive field which is believed to be copper-bearing, but the existing conditions of both mines lead the directors to contemplate extensions of their working areas. The Messina Mine in the north was roughly worked generations ago, and is only now being scientifically developed. There is an area of 22,000 acres of which less than 600 acres have yet been worked, although the ore is known to exist in the rest of the area. There are two shafts, but until 1913 the output was necessarily limited by the absence of a railway. This has now been completed and is in operation, with the result that the production is being rapidly increased. While very rich patches have been from time to time discovered in the mine there is an all-round average of fully 10 per cent. of copper in the ore, which is converted into concentrates averaging about 50 per cent. and shipped in this form to Swansea. Now, however, that the railway has brought the mine into connection with a neighbouring coalfield it is intended to go a step further and convert the concentrates into a matte. Further refining is not likely to be immediately undertaken. The value of the total production of copper in the Union in 1915 was 1,042,000*l*. But while, as has been already said, there are only three working mines in the Union it is practically certain that enormous fields of copper remain to be opened up.

TIN.

211. Tin has not hitherto bulked largely in the output of the Union mines, the total output in 1915 having amounted only to 331,420*l*. Almost the whole

of this was produced from mines in the Transvaal, although the African Alluvial Tin Mining Company is now operating a field near Cape Town with very promising results. The tin area in the Transvaal has been hardly more than scratched, and there is little doubt that there is ample room for very large and profitable developments.

OTHER MINERALS.

212. In addition to the important minerals referred to in detail above, the Union produces asbestos, graphite, magnesite, zinc, manganese, lead, mica, corundum, salt, lime, flint, with bricks, cement, &c.

OIL, GAS, AND SHALE.

213. The importance of a supply of natural oil not only for the industries of South Africa, but also for the provision of fuel for the Navy, has led to a considerable amount of careful survey, with a view to discovering whether this supply can be found in any form in the Union. A report was published in 1914 of an examination made by Mr. Cunningham Craig, the well-known expert.* His report is, on the whole, somewhat discouraging, and it may be worth while to quote his final conclusion:—

> "I am of opinion," he says, "that prospecting of the folded "belt of the Karroo system for crude petroleum and natural gas "is of less importance than the development of shale mining and "refining, and may, therefore, be relegated to secondary place. "All the evidence to hand at present leads to the belief that an "oil shale industry has good prospects of proving successful, and I "would urge that no effort should be spared to ensure that a fair "test of its possibilities be made."†

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* Mr. Craig states that (with the possible exception of North-East Natal) favourable geological structure is only found in the Cape Province, and there only in a narrow strip at the south edge of the Karroo. He recommends that some investigations should be made in this belt before abandoning the hope of striking petroleum.

† Report on Petroleum Prospects in the Union of South Africa [U.G. No. 3, 1914], p. 28.

Newfoundland.

214. In our Fourth Interim Report* we remarked with respect to the mineral resources of Newfoundland that, while much is surmised, comparatively little is known. This is the conclusion at which we arrived after the fullest inquiry which it was possible for us to make. Unfortunately during the time we were in the Island, the Government Geologist was confined to his house by severe illness, and was thus unable to meet us, though he furnished us with an interesting Memorandum. We had, therefore, to content ourselves with such non-professional evidence as was available. Since then, however, the Island has been visited by the Director of the Imperial Institute, who met and talked with the Government Geologist. We have had some conversation with the Director on the subject, and the information we have gathered from him confirms the opinions at which we had previously arrived. These opinions are indicated in what follows, but we have to emphasise the fact that they are founded on very incomplete information. The geological work in Newfoundland has to be done with a very inadequate staff, and we think it is desirable that, as soon as the financial resources of the Colony permit, a geological survey of the Island should be undertaken, more complete and exhaustive than anything yet attempted.

GOLD.

215. There are indications of the existence of gold in many parts of the Colony, and free gold has been frequently found—mainly in quartz veins. Various attempts have been made to recover the metal, but they have hitherto proved financially unsuccessful. We have had no very satisfactory explanation of this, but we imagine that these attempts have been sporadic,

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† [Cd. 7711], p. 9.

that they have been conducted without much skill or enterprise, and that there has not been sufficient capital available to bring the experiments to a conclusive test. Most of the copper ores contain gold, but the quantity is very limited, and in this respect they cannot be compared with the copper ores of Mount Morgan, or even of Mount Lyell, in Australia.

SILVER.

216. There are no silver mines in the Colony, but the metal is found in combination with copper and lead. Some of the galena areas are said to be rich in silver, but there is, unfortunately, no statistical information on which it is possible to found a definite opinion.

COPPER.

217. Apart from the iron ores of Bell Island to which reference will be made immediately, copper has hitherto been, and will probably continue to be, the most important mineral product of Newfoundland. The Union Mine at Tilt Cove was worked for nearly fifty years, and the Cape Copper Company who were latterly the lessees, stopped operations there only in 1913, probably because they had reached the end of profitable working.* But other mines are in process of development with considerable promise. The ore in these mines appears to be of satisfactory quality, containing, as it does, 10 to 15 per cent. of metallic copper, and a discovery was reported from Little Bay, Notre Dame Bay, towards the end of 1916, said to assay as much as 29 per cent. Besides the mines at work or being opened up, there are numerous indications of the metal all round the coast, and the operations of the Anglo-Newfoundland Development Company have revealed its existence on Red Indian Lake.

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* We understand, however, that since the War this mine has been taken over by a local company and worked with satisfactory results.

in the very heart of the interior. In view of this, and of the fact that prospecting has not hitherto extended beyond a few miles from the coast, it is very probable that further extensive discoveries will yet be made. Mention has already been made of the fact that most of the ores hitherto found contain a small quantity of gold and a little silver.

LEAD.

218. Nothing more can be said than that galena ores exist in many districts, but that although a good deal of lead mining was done many years ago, the industry has latterly been quite neglected. We were unable to ascertain what was precisely the cause of the stoppage.

IRON.

219. In our Fourth Interim Report we made special reference to the Wabana Mine*—wonderful in its magnitude and in many respects unique. Full details of its history and of the stage of development it has reached are set forth in memoranda printed in the evidence, to which reference should be made.† It may therefore be enough to say here that the mine is situated in Bell Island, some three miles from the shore of Newfoundland; that the mineralised area extends along the shore and for at least three miles under the sea; that it is estimated on reasonable grounds to contain from 3,000,000,000 to 4,000,000,000 tons of ore; that the output of 1913 amounted to 1,500,000 tons, and that it is the property of the Nova Scotia Steel and Coal Company, and the Dominion Iron and Steel Company. Both of these companies use this ore exclusively at their works in Nova Scotia. The percentage of phosphorus contained in the ore renders it unsuitable for making the highest

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* P. 10 of [Cd. 7711].

† Pp. 70–77 and pp. 81–87 of [Cd. 7898].

class of steel, but the ore is remarkably uniform in quality—the variations being quite insignificant. Large quantities of this ore were shipped to Europe before the War—mainly to Germany; comparatively little has as yet been used in Great Britain, but the demand from there is likely to increase,—it may be rapidly,—and it is gratifying to know that a source of supply so enormous in extent and so near the shores of the United Kingdom is available within Your Majesty's Dominions.

While the Wabana deposits overshadow all others in Newfoundland, some of the others known to exist appear to deserve careful examination. We were told of some, unusually free from impurities, but nothing is yet definitely known as to their extent.

COAL.

220. The extent of the coal measures, so far as yet known, is stated in considerable detail in the Memorandum from the Government Geologist to which reference is made above.* The seams vary in thickness from only a few inches to several feet, and where the coal is mixed with shale it would be difficult to work it profitably. On the whole, however, the prospects are fairly promising; several of the fields are undoubtedly good, that in the Alderley Brook district being perhaps the best. But development will inevitably be conditioned by the price at which coal can be imported from the Nova Scotian fields, where the quality is excellent and the supply practically inexhaustible.

LIMESTONE.

221. Limestone has been found to exist in at least one district of the Island, and steady progress is being made in the development of what may prove to be a

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* Pp. 84–87 of [Cd. 7898].

large industry. The stone when burned might be profitably applied in many districts to the soil which, although good in other respects, would be greatly benefited by lime.

OIL.

222. The existence of very large areas of oil-bearing shale has been clearly proved, and the known facts indicate that development would in all probability give extremely satisfactory results. We qualify this opinion only because in relation to the extent of the area the number of bores and tests as yet made is very small. These tests so far show that the shale is similar to the Scotch shales, having produced as much as 30 gallons of crude oil and 30 to 50 lbs. of sulphate of ammonia per ton.* If the additional bores which we think should be made give similar results, the prospects of satisfactory working would be exceedingly good.

It is in contemplation to work these areas in combination with a company formed in Nova Scotia to develop the shale areas in that Province. Such a combination would probably tend to secure both the necessary capital and efficient management.

Petroleum has at different times been pumped from wells in the Island, but there appears to be no record in existence of what has been done in respect of quantity or quality.

OTHER MINERALS.

223. There are numerous other minerals found in the Island, though little is known as to the quantities in existence. They are detailed in the Memorandum from the Government Geologist, but special mention

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* Harvey, p 78 of [Cd. 7898].

may be made here of the high class slate which exists in abundance on both the east and west sides of the Island, and of the many varieties of excellent building-stone.

FOREST RESOURCES.

224. We have obtained a considerable amount of information in the course of our various visits as to the forest resources of the self-governing Dominions. The statements made to us are set out at length in the published evidence and we have supplemented this testimony by conversations with many interested in the subject and, where possible, by visits to the forest areas themselves.

We give a brief summary of the situation.

Canada.

AREA OF FORESTS.

225. The forest resources of Canada undoubtedly form one of the most valuable assets of the Empire. The extent of the timber lands of the Dominion is so vast and so varied in character that no adequate survey of their area and commercial value has yet been undertaken. Estimates of the Forestry Branch of the Department of the Interior place the extent of land covered by timber in the Dominion at between five hundred million and six hundred million acres, or about a quarter of the land area of Canada. A large proportion of this, however, does not yield commercial timber. Estimates of the amount of merchantable timber vary greatly. The Minister of the Department of the Interior has given us a figure of 250,000,000 acres as the estimated area covered with trees which could be used for sawing into timber. In addition, there is land covered with timber which is valuable as pulp wood, and for other purposes.

226. The main distribution of the commercial timber throughout the Dominion has been estimated by the Forestry Branch of the Department of the Interior to be as follows:—

	Acres.
British Columbia	50,000,000
Alberta, Saskatchewan, Manitoba ...	11,000,000
Ontario	70,000,000
Quebec	100,000,000
New Brunswick	9,000,000
Nova Scotia	5,000,000

In the north of Alberta there are very large areas covered with wood which is of no commercial value, except for local purposes such as firewood and fencing. The North-West Territories and the Yukon contain wood which can be used locally, but the forest areas there are regarded as having no commercial value. Enormous tracts have been burnt repeatedly by forest fires, and a considerable proportion of the most northerly part of the country consists of tundra.*

VARIETIES OF TIMBER.

227. Amongst Canadian trees the Spruce is perhaps of the most commercial importance, being used for the production of both lumber and pulp; it is widely distributed throughout Canada, but is cut especially in Quebec and the Maritime Provinces.

In British Columbia and the mountainous part of Alberta the Douglas Fir yields splendid timber of the largest size, and is cut in greater quantities than any other single species.

In Ontario, White Pine is the timber most largely cut; it grows throughout the Maritime Provinces as well as in Quebec and parts of Manitoba.

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* *i.e.*, swampy land only traversable in winter.

In New Brunswick Cedar is common and it is also cut in large quantities in Ontario and Quebec; it is used mainly for poles and fence posts, shingles, &c. Of Maple trees there are several different species in Canada; the wood is used for lumber and fuel as well as furniture and building. Syrup and sugar are derived from the Maple tree, especially in Quebec and New Brunswick.

OUTPUT, ETC.

228. The value of the forest produce of the Dominion has been estimated to be worth, on the average, about 37,000,000*l*. per annum. The figures for the years 1911-1914 were as follows:—

	£
1911	35,542,000
1912	37,979,000
1913	36,900,000
1914	36,807,000

Lumber, lath and shingles, firewood and pulpwood, comprise about 80 per cent. of the total value.

The value of the produce of the forests exported is nearly 10,000,000*l*. per annum consisting in the main of lumber, pulpwood and paper.* The imports of manufactured and unmanufactured wood are considerable, averaging nearly 3,750,000*l*. per annum, of which boards, planks, deals, &c., form about 33 per cent. Some portion of the imports, however, consists of woods not found in Canada or not in sufficient quantity.

The annual rate of consumption in 1914 was calculated to be about 2½ billion cubic feet. A similar quantity is destroyed annually by fire, disease, insects, &c. It has been estimated that the forest resources of the Dominion suffer a gross diminution to the extent of five billion cubic feet per annum.

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* For the growing exports of paper, *see* p. 50 of [Cd. 8457].

ADMINISTRATION AND CONSERVATION.

229. The forests in the Dominion are administered by the Provincial authorities with the exception of the Dominion lands in Manitoba, Saskatchewan, Alberta, and certain portions of British Columbia. The Federal authorities have not yet established any School of Forestry, but arrangements have been made for lectures to be given from time to time by members of the Dominion Forest Service in different centres throughout the Dominion. Forest schools have, however, been established in Ontario, in connection with the Toronto University, and in Quebec and New Brunswick, and lectures are given by the forestry experts of the Provincial Government at the Agricultural College in Ontario.

230. It has been estimated that if the present cut of timber is maintained in Canada the supply of saw timber will be exhausted in 120 years, but if the rate of cutting increases, the supply may be exhausted in half that period.* That the latter contingency is probable may be gauged from the fact that, in spite of the large number of substitutes available, the demand for wood is continually growing.

231. With an outlook of this kind it is not surprising that the question of proper conservation and re-afforestation has aroused much attention in Canada. The subject is receiving more and more serious consideration each year, and its principles are becoming more clearly understood and more carefully practised. In this connection we quote the statement put before us by the Canadian Commission of Conservation,† which has been engaged in promoting a national

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* Campbell, p. 207, of [Cd 8459].

† White, p. 2 of [Cd. 8459].

forestry policy with the object of retaining for the Dominion the proper utilisation of its timber supplies:—

> ". . . For many years the administration of Canadian forests represented the acme of extravagance, due largely to the patently false assumption that the forest resources of the Dominion are inexhaustible. More definite knowledge of their actual extent and the rate at which they are being depleted has served to give a more nearly correct perspective though much still remains to be accomplished in this direction.
>
> "The primary problem has been to check the enormous annual waste from forest fires. The most serious waste—the severe loss caused by fire spreading from railway rights of way—has been greatly reduced through amendments to the Railway Act, proposed by the Committee on Forests, whereby the railways under the jurisdiction of the Dominion Board of Railway Commissioners have been made responsible for extinguishing fires due to railway agencies . . . ."

232. We think it a matter for regret that similar regulations to those of the Board of Railway Commissioners do not apply to all the other railways of Canada, for example, the Dominion Government Railways and those built under Provincial charters.* We also regard it as important that Dominion and Provincial legislation in regard to fire protection generally should be uniform, and it is equally important that such legislation should be strictly enforced. We view with much sympathy the proposal to create a special organisation representing all the forest administrations to consider and advise on all forestry questions in the Dominion,† and we hope that conditions will soon permit of this organisation being started.

233. The Dominion and Provincial Governments during recent years have been setting aside various reserves for the purpose of securing a permanent supply of timber, of conserving the water supply and protecting animal life. Under successive enactments the total area of the forest reserves of Canada increased

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* *See* Campbell, Q. 2662, p. 210, of [Cd. 8459].

† *Id.* Q. 2633, p. 209, of [Cd. 8459].

from seven-and-a-half million acres in 1901 to 153,000,000 acres in 1914, which are mainly under Federal jurisdiction and partly under the control of various Provincial authorities. We doubt, however, whether these forest reserves are as yet under an efficient and economic system of administration worthy of the vast natural wealth which they represent.

Australia.

AREA OF FORESTS.

234. Although huge tracts, especially in the central portions of Australia, are entirely treeless, valuable forests exist on the high lands, especially those near the coast. Indeed, we regard Australian forests, if properly conserved, as one of the most important and valuable natural assets of the Commonwealth. Tasmania in particular is well supplied with timber, and about two-thirds of the total area of the island are under forest. On the mainland the proportion is much smaller, and probably does not amount to more than four or five per cent. of the total land area.

Estimates which have been made at different times of the forest lands in the various Australian States differ considerably, probably on account of the varying definition given to the term "forests" by different authorities. The Commonwealth Statistician estimates the total forest area of the Commonwealth at 102,000,000 acres, of which less than 17,000,000 acres have been specially conserved for timber.* Mr. Hugh Mackay, Conservator of Forests for the State of Victoria, giving evidence before us, considered that the true forest area of Australia was only about 80,000,000 acres. This estimate, however, excludes forests of little or no commercial value. Other estimates, which include inferior timber and trees useful for local purposes, range up to more than twice Mr. Mackay's figure.*

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* Official Year Book of the Commonwealth. No. 9, p. 382.

VARIETIES OF TIMBER.

235. Australia possesses many varieties of trees that are peculiar to the Commonwealth, some of which are of great value as cabinet woods. We mention below certain of the principal woods in each State.

In New South Wales the principal hardwoods are Ironbarks (very heavy woods and not exceeded in any part of the continent for strength and durability) and Murray Red Gum (also noted for its strength and its resistance to fungus disease). The principal softwood is Moreton Bay Pine.

In Victoria the leading varieties are Stringybark (a hardwood useful for buildings and valuable for rails and fuel), Blackwood (used for furniture, carriage building, &c.), and the Mountain Ash (*Eucalyptus amygdalina*), which sometimes attains a height of 380 feet.

In Queensland the chief hardwoods are of the eucalyptus species, and of the soft woods may be mentioned the hoop pyne, bunya pyne, and other conifers allied to the genus *araucaria*.

In South Australia also the eucalypts are found, principally red gum, blue gum, pink gum, and sugar gum, whilst some of the best known pines of commerce have been successfully acclimatised.

In Western Australia special mention must be made of Jarrah (*Eucalyptus marginata*) which is of red colour, hard and dense in the grain, and largely used for piles in jetties and in ship construction, and of Karri (*Eucalyptus diversicolor*) one of the largest trees in Australia, with an average height of 200 feet, which is used extensively for wood paving in Great Britain.

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* [Cd. 7172], p. 145.

In Tasmania the Huon Pine (*Dacrydium franklinii*) is a fine, strong and light timber. It is almost indestructible in water and is largely used for boat planking. We were informed, however, that this valuable species is being rapidly cut out.

OUTPUT, ETC.

236. No definite figures exist as to the output of Australia, though returns of local timber sawn and hewn are compiled by the various States. According to these the total output of timber in the Commonwealth in 1914 was 673 million superficial feet.

In spite of its natural timber wealth, Australia imported over 2,000,000*l*. worth of timber in 1914-5 (mainly consisting of woods not found in the Commonwealth, or not in sufficient quantity), whereas the export of undressed (sawn) timber only amounted to 780,000*l*. in the same year.

ADMINISTRATION AND CONSERVATION.

237. There is no Federal forestry department in the Commonwealth, and though each State has instituted some conservation methods of its own, we are not satisfied that enough has been done. We are glad to observe, however, that there is a movement towards co-operation between the Forest Departments of the various States. Thus an Inter-State Conference of forestry was held at Adelaide in May 1916, and it is proposed to hold similar conferences annually in future. At the 1916 conference a scheme was approved to provide for the uniform training of a competent staff for the forestry services, and a resolution was passed advocating the exchange of officers between the different States.*

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* Report of the Resolutions, &c., of the Inter-State Conference on Forestry, Adelaide, 1916. South Australian Government Paper No. 26 of 1916.

Much, however, remains to be done. The total number of persons employed in the Forestry Departments of the various Australian States in 1914 was only 595, and the total expenditure of the year 1914-15 was only 158,000*l*. Tasmania, which possesses some of the finest forest areas in the Commonwealth, spent only 1,200*l*. on forestry in that year.

238. We were impressed during our visit to the Commonwealth by the wastage caused by the practice of clearing timber lands by fire or ring-barking, in order to improve land for settlement. We understand, however, that the need for re-afforestation, and for further legislation to restrict forest fires is one which is receiving attention in Australia. Natural re-afforestation, it is true, occurs after bush fires; some species of eucalyptus re-afforest rapidly, but natural re-afforestation alone, which is a slow process, cannot be relied on for the reproduction of the waste. In South Australia, where there is little forest land, the State is doing much in the way of planting.

New Zealand.

AREA OF FORESTS.

239. The forest area of the Dominion of New Zealand amounts to nearly 8,000,000 acres, or about one-eighth of the total land area.

The area of forest reserves is not definitely known, but we notice that the Royal Commission on Forestry in New Zealand, reporting in May 1913,* recommended that all mountain forests should be permanently reserved for climatic and water-conservation purposes, and to prevent soil-denudation.

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* Report of Royal Commission on Forestry, New Zealand [C. 12 of 1913].

VARIETIES OF TIMBER.

240. The chief varieties of timber which deserve mention are these:—

The Kauri Pine (*Agathis Australis*) is almost entirely confined to the northern part of the North Island. It attains a height of 120-160 feet, and an average girth of about 12 feet, but its growth to maturity is very slow, taking from 600 to 1,200 years, or, according to some authorities, even longer. It is strong and durable, and is used in large quantities for general building and construction, furniture, joinery, &c. This splendid and valuable tree is being rapidly destroyed; it is very sensitive to injury from fire, and even from smoke.

The Totara (*Podoscarpus Totara*) is found generally throughout the Dominion. It is very durable, and largely used in the construction of wharves and for general building purposes.

The Rimu or Red Pine is very widely distributed, and is, in fact, the principal timber of New Zealand.

The Kahikatea or White Pine is found extensively in low, swampy districts, and is most largely used for butter boxes, considerable quantities being used in local markets and exported.

The Rata tree, which is chiefly used for firewood, is hard, heavy, rough, and very strong.

OUTPUT, ETC.

241. The supply of the indigenous forests is diminishing, and the estimated amount of timber remaining decreased from 41,723,574,000 superficial feet in 1905 to 33,060,883,000 superficial feet in 1909.*

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* New Zealand Official Year Book, 1914, p. 968

As regards this last estimate, the Royal Commission on Forestry, which we have already quoted, says:—

> "It is at best a guess, and no one can truly say whether the amount be too much or too little. Our opinion is that it is not safe to conclude that there will be any supply of moment at the expiration of 30 years from the present time (1913), and that unless more stringent methods are adopted to conserve the supply as far as possible, the period of supply may be even shortened."*

The output of timber for commercial purposes at present is probably rather more than 400,000,000 superficial feet per annum, while timber, sawn and hewn, to the extent of some 83,000,000 superficial feet,† is exported, mainly to Australia. The imports of timber and wooden wares come also mainly from the Commonwealth and the United States.

ADMINISTRATION AND CONSERVATION.

242. The forests are administered by the Forestry Branch of the Department of Lands. Steps have been taken in recent years by the Dominion authorities to establish nurseries and plantations in both the North and South islands. On March 31st, 1915, there were about 21,000,000 trees in the four nurseries of the Forestry Branch, whilst six and a half million trees had been distributed to Government plantations, &c., during the preceding 12 months. In the 11 Government plantations a total area of 24,563 acres had been planted with 54,000,000 trees. The annual expenditure now averages over 9,700*l*. on the nurseries, and about 19,000*l*. on the plantations. Experiments have been made to select the most suitable exotics with which to re-afforest the land. It is regrettable to record that the re-afforestation of the indigenous trees of New Zealand is not thought to be practicable, since the length of time required for the trees to mature varies from 100 to 500 years.

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* P. xxx. of Report of Royal Commission on Forestry, New Zealand [C. 12 of 1913].

† Average of years 1911–15.

Union of South Africa.

AREA OF FORESTS.

243. The area of indigenous forests in South Africa is very small; it is estimated that out of a total area of nearly 474,000 square miles only 450,000 acres are covered with native woods. In addition, about 61,000 acres have been planted with exotic trees, mainly eucalypts, pines, and firs. The forests lie mainly along the mountain ranges which follow the southern and south-eastern coasts. Some inland areas with high rainfall also carry native trees.*

VARIETIES OF TIMBER.

244. The most valuable indigenous timber in South Africa is stinkwood, which is used for cabinet-making and wagon-building. Yellow-wood, which is used in building and in the manufacture of sleepers, is also of economic importance, whilst the durability of sneezewood renders it valuable for fencing poles. Amongst the trees which have been introduced into South Africa the wattle is perhaps the most important, although yielding no sawing timber; probably more than 250,000 acres have been planted with wattle, especially in Natal. The wood is used for fuel and mine props, while the bark yields an important tanning substance. Formerly this bark was shipped in large quantities to Germany. Attempts have been made at various times to establish factories for the production of the extract of wattle bark locally, and we understand that one firm is now making the extract in Natal and that other factories are being started.

OUTPUT, ETC.

245. The amount of wood cut during the year 1910-11, the latest year for which figures are available,

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* Legat, Q. 6022, p. 286 of [Cd. 7706].

was about 14 million cubic feet, and whilst the export of South African timber does not, on the average, exceed 5,000*l.* in value each year, the imports of unmanufactured timber during the years 1913 to 1915 averaged about 520,000*l.*, representing about 8½ million cubic feet, of which the greater proportion was pine.

ADMINISTRATION AND CONSERVATION.

246. The Government of the Union has devoted considerable attention to forestry questions, and in 1913 the Union Forest Act was passed with the object of conserving and increasing the forestry production. We were informed in 1914 that the executive staff of the Union included 149 officers, and that training for subordinate officials was provided in a forest school at the Cape Peninsula. We are glad to note the wise policy of the Union Government in this matter. While in South Africa we visited some of the afforested areas in the Cape Peninsula, and found that the conifers and eucalypts which have been planted are flourishing extremely.

Newfoundland.

AREA OF FORESTS.

247. Considerable areas of timbered lands exist in Newfoundland, especially in the valleys of the rivers and on the banks of the lakes, as well as along certain portions of the coast line. The total area of forest land in Newfoundland is estimated at about 10,000 square miles,* and in addition there are considerable forests, mainly of spruce, in Labrador. No official information exists as to the extent of timbered country in Labrador, but from reports of various surveys it

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* Horwood, p 54 of [Cd. 7898].

would appear that the timber resources of that region merit investigation, especially with a view to the manufacture of pulp.

VARIETIES OF TIMBER.

248. Amongst the varieties of trees in Newfoundland forests Spruce predominates. This has been found to be one of the best known materials for the manufacture of wood pulp. Other trees which are found in quantities are Fir, White Pine, White and Yellow Birch, and Tamarack or Juniper.

OUTPUT, ETC.

249. The total cut of timber has rapidly increased during the last few years as shown by the following figures:—

1909-10	...	79,492,000	feet, wood measure.
1910-11	...	120,346,000	,, ,,
1911-12	...	153,560,000	,, ,,

In 1911 there were 349 saw mills in operation, employing 2,550 men, and practically the whole of the output was used for domestic consumption. We were informed in 1914 that this average annual domestic consumption was about 70,000,000 superficial feet.

The export of lumber has gradually declined in recent years; this decline is, however, accounted for by the transfer of the saw-mill licences to the proprietors of the pulp and paper companies, who are directing all their energies to building up this new industry.

The manufacture of wood pulp was only introduced seven or eight years ago. The possession of suitable water-power has encouraged this manufacture in the Colony, and it appears to us that in the future Newfoundland will become one of the most important contributors to the world's supply of wood pulp and paper.

During our visit to the Colony we were much interested by our inspection of the pulp mills of the Anglo-Newfoundland Development Company, the pioneer of the industry in Newfoundland. At the time of our visit these mills alone were capable of supplying daily about 200 tons of paper and in addition a surplus production of ground wood pulp for export, averaging about 30 tons per day.

ADMINISTRATION AND CONSERVATION.

250. We are of opinion that the question of the proper conservation of the timber supplies of Newfoundland has not received the consideration it merits. We were informed* that in the past large sections of the best timber country were burnt over by forest fires, but steps are now being taken to guard against loss of this kind, especially along the line of railway. The question of re-afforestation and the legislation to prevent wasteful cutting is an urgent one which needs attention.

We understand that the Anglo-Newfoundland Development Company has already taken effective steps towards the conservation of the forests under its control by the institution of regulations to prevent loss by fire and to ensure systematic cutting, and contemplates a scheme of re-afforestation.

FISHERIES.

Canada.

251. The fishing industries of Canada boast a high degree of antiquity. Already in the 16th century, reports of the wealth of the Canadian seas aroused great interest in France, and in 1542 no less than 60 ships went to fish for cod in the waters of New France.†

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* Horwood, p. 56 of [Cd. 7898]. † Chambers, p. 246 of [Cd. 8459].

The industry thus started was continued throughout the French rule, and the Canadian waters became the chief nursery of recruits for the French navy. One of the fishing companies of Halifax, Nova Scotia, can trace its operations back to the year 1764, when the firm was founded by capitalists from the Channel Islands.

252. It is not, therefore, surprising to find that at the present day the fisheries of Canada and their subsidiary industries play a considerable part in the economic life of the Dominion. According to a report by the Fisheries Branch of the Department of Marine and Fisheries the total value of all kinds of sea fish, &c., landed by Canadian fishermen during the year ended March 31st, 1914, amounted to nearly 4,500,000*l*. It is interesting to note that in the United Kingdom the value of sea fish landed during 1913 amounted to 14,700,000*l*. Already, therefore, the value of the sea fisheries of Canada is nearly one-third that of the Mother Country. The sea fisheries give employment to 86,000 persons, and the inland fisheries to about 12,000 persons. After preparation for market, the total value of sea fish and those taken from inland waters in Canada was increased to 6,900,000*l*. in 1913-14.

253. The deep-sea fisheries of the Dominion are carried on in vessels of from 40 to 100 tons, the crew being from 10 to 30 men; whilst for the inshore fisheries small boats carrying from four to seven men are employed. The use of motor boats driven by gasoline engines is increasing rapidly.

CHIEF VARIETIES OF FISH.

Salmon.

254. Among Canadian fish of economic value, the salmon is of the greatest importance. The total

quantity of salmon landed during the year 1913-14 was 155,000,000 lbs., of a market value of 2,300,000*l*. There are a number of varieties of salmon in Canadian waters, and the Atlantic species differs from those found in British Columbia. The Atlantic salmon are practically all consumed fresh in Canada and the United States. Pacific salmon, on the other hand, are mainly preserved in cans and shipped to oversea markets. The British Columbia salmon fisheries represent some 95 per cent. of the total value of salmon landed.

255. Of the British Columbia salmon the species of most commercial value are the "Chinook" or "King," and the "Sockeye" salmon. These are the varieties chiefly used in the Pacific canneries. Their flesh is of a rich red colour; they are of fine flavour, and contain a large amount of oil. Other varieties are the "Red Spring," the "Cohoe," the "Quinnat" (the largest of the Pacific coast salmon) and the "Humpback," all of which have flesh of a paler colour, and are somewhat inferior in flavour and oil. There is also the "Dog" or "Chum" salmon, which is not usually canned, but marketed when fresh, or salted

256. It was represented in evidence in British Columbia* that the salmon fisheries of the Province, notably those of the Fraser River, were in danger of depletion, unless more adequate measures were adopted for their conservation. We commend this point to the attention of the Canadian Government.

Lobster.

257. In commercial importance the lobster fishery ranks next to the salmon fishery; it is, however, confined to the Atlantic coast. The catch in the year

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* Bell-Irving p 238 of [Cd. 8459].

ended March 31st, 1914. was 51,000,000 lbs., distributed as follows: —

	Lbs.
Nova Scotia	30,000,000
Prince Edward Island	9,000,000
New Brunswick	8,000,000
Quebec	4,000,000

The total represented a market value of slightly less than 1,000,000*l*. Whilst a considerable part of the catch is sent to the United States for consumption as fresh fish, the greater part of the lobsters taken are canned, and there are about 700 canneries working along the Atlantic coast. These lobsters find a profitable market in the United States, the United Kingdom, and France.

Cod.

258. The cod fishery, which ranks third in importance, is almost entirely confined to the Atlantic coast, although a variety of cod is also obtained in the waters of British Columbia. The cod fishing season generally lasts from April to November. The fish are usually dried and salted, and a very large export trade is carried on with Southern Europe, the United States, the West Indies, and South America. The cod fishery has remained practically stationary for some years and the catch now is of about the same value as it was 30 years ago. In 1913-14 the catch amounted to 166,000,000 lbs. of a market value of 700,000*l*.

Herring.

259. Next in importance to cod comes the herring. Of this fish 248,000,000 lbs., of a market value of between 600,000*l*. and 700,000*l*., were landed in 1913-14. This is largely an Atlantic fishery, the greatest catch being recorded in New Brunswick. Although considerable quantities of the herring are salted for

food, a large proportion of the catch is used as bait and as a fertiliser. Herring caught on the Pacific coast is used partly as bait for halibut, but certain quantities are also salted for export.

Halibut.

260. The halibut fishery is mainly a deep-water fishery carried on off the coast of British Columbia. The total Canadian catch in 1913-14 was 25,000,000 lbs., valued for market at about 420,000*l*. The size of British Columbia halibut is often enormous. We saw in Prince Rupert fish of six and eight feet in length and 300 lbs. in weight, although those of medium size, say from 10 to 80 lbs., are in greatest favour. Large quantities are sent from the Pacific coast, either on layers of ice, or in a frozen condition, to Eastern Canada and the United States. In fact, the trade is developing to still further distances, and we were told that halibut has been marketed successfully in the United Kingdom, and even in Australia, New Zealand, and the Union of South Africa.*

Other Fish.

261. Other salt-water fish of commercial importance which are found in Canadian waters are haddock, hake, and pollack which are caught by the Atlantic fishermen when engaged in cod fishing. Mackerel are also found on the Atlantic coast, and are landed in considerable quantities in Nova Scotia and Prince Edward Island. The most important fresh-water fish of Canada is the "Whitefish," which is obtained in the lakes and rivers of the Eastern and Northern parts of the Dominion. This fish, the recorded catch of which represents the value of nearly 200,000*l*. a year, is similar to the pollan of certain European lakes and

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* Johnson, p. 231 of [Cd. 8459].

is highly esteemed as an article of food. Canadian inland waters are famed for their supplies of many varieties of trout and other fish of the salmon family. The Great Lake Trout, a very large species, is another excellent food fish, and the catch is valued at about 160,000*l*. a year.

262. The production of oysters in Canada at the present time represents annually a value of some 40,000*l*. The Malpeque oyster of Prince Edward Island is of a rather large variety, which we found to be of excellent flavour, and is very valuable as an article of food. The majority of other Canadian oysters are of small size, but attempts are being made to transplant the Prince Edward Island oysters to other beds.

FRESH-WATER FISHERIES.

263. The administration of the Canadian fisheries fresh-water fisheries of South Africa, and very little Dominion Government, and the Department of Marine and Fisheries at Ottawa maintains a very large staff of officers who render valuable aid to the fishing industries. It has, however, been decided by the Judicature that the Provinces have rights in their own fisheries, especially those along the shores of Crown lands, though it has been laid down that in spite of Provincial rights the making of fishery laws rests with the Dominion Government.

GOVERNMENT ASSISTANCE TO FISHERIES.

264. During our visits to the Dominion we were furnished with interesting evidence from various officers and notably from the Commissioner of Fisheries at Ottawa,[*] detailing the various methods of assistance which are accorded by the Central and Local Governments to the fishing industry.

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[*] Prince, p. 241 of [Cd. 8459].

265. We may here summarise some of the more important Government methods of assistance:—

(1) A sum of 32,000*l.* is distributed annually to fishermen as a bounty to encourage the development of the deep-sea fishing. This is distributed on certain conditions to Canadian fishermen who have engaged in deep-sea fishing in Canadian boats for at least three months of the year and have caught not less than 25 cwt. of sea fish.

(2) In order to prevent the loss of time by the search for bait during the fishing months of the year, a Fisheries Intelligence Bureau has been established to collect information concerning bait supplies and forward it by telegraph to certain important fishing centres.

(3) The Government gives certain assistance as regards railway facilities and railway rates for the carriage of fish from the Pacific and Atlantic coasts to inland centres.

(4) Various biological stations have been established at different places in Canada as well as hatcheries for the propagation of different species.

Experiments have also been made at certain places in improved methods of preparing fish for market, *e.g.*, a fish-drying station has been established on Prince Edward Island, and various experimental works have been set up for the treatment of waste produce of the fisheries.

(5) In order to encourage improved methods of packing, the Department of Marine and Fisheries has made regulations for Government inspection and branding of

certain kinds of fish. This inspection is not compulsory, but it is hoped that the brand will in time be recognised all over the world as a mark of quality and that all fish products will be submitted for inspection. The Fish Canneries Act also provides for a proper system of sanitary inspection of canning factories.

FUTURE EXPANSION.

266. In our view the Canadian fishing industry is capable of considerable development. In the first place there are very large fishing areas which are hardly worked at the present time, especially—

(i) The deep-sea fisheries off the Atlantic coast,
(ii) The Bank fisheries off the Pacific coast,
(iii) The fisheries in the Great Northern Lakes and the waters of Hudson Bay, many of which are at the present time practically untouched.

267. The abundance of the supply of Canadian fish led to unduly wasteful methods in the past, and even at the present time many valuable products are unutilized. The production of fish oil, fish glue, and fish fertilizers, is at present very small, and Canada should later on be able to develop a large subsidiary industry in these articles in the same way as Japan has done.

Australia.

268. The supply of fish in Australian waters is both varied and abundant. It has been estimated that the number of Australian species of marine and freshwater fish exceeds 2,000.*

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* Commonwealth of Australia Fisheries Biological Results. Vol. 2, Part 3, Sydney, 1914, p. 77.

CHIEF VARIETIES OF FISH.

269. Amongst edible sea fish, the snapper, flathead, cod, and perch are perhaps the most important. Valuable inshore fishes include mullet, whiting, bream, and garfish. The abundance of the supplies of fish in Australian waters may be illustrated by reference to experiments carried out by the Federal investigation ship "Endeavour"; the result of fishings on the Flinders Bank by this ship showed almost twice as large a catch per hour as that of a similarly equipped vessel in Moray Firth and Aberdeen Bay in Scotland.*

As an addition to the indigenous fresh-water fish, English brown trout and American rainbow trout have been introduced into a number of the Australian rivers and have done very well.

270. Excellent natural oyster beds exist along the coast line, especially in New South Wales and Queensland. Smaller quantities are obtained in South Australia and Victoria. The outlook for the oyster fisheries is said to be very promising.

271. Amongst the special fishing industries of Australia, mention must be made of the pearl shell fisheries which extend along the northern coast of Western Australia and Queensland. This area is said to produce some 80 per cent. of the world's supply of white mother-of-pearl. The industry has attained such importance that in 1912 the exports of pearls and pearl shell from Western Australia were valued at over half-a-million sterling. The trade, however, was completely disorganised for some time after the outbreak of war owing to the restriction of the market for pearl shell. During our visit to Western Australia we received interesting evidence† describing the

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* Report of fishing experiments carried out by the investigation ship "Endeavour," 12th March–7th September, 1909.

† [Cd. 7172], pp. 161–4.

methods employed. Coloured labour was mainly used, but it was then proposed that the issue of permits to indenture Asiatics for the pearl fleet should cease after 1913; this question, however, was subsequently considered by an Australian Royal Commission, and it seems probable that the employment of coloured labour may be allowed to continue.*

272. Another Australian fishing industry of interest is that for bêche-de-mer, or trepang. This is a kind of sea-slug, which is much esteemed as an article of diet in China and Japan and is obtained off the coast of Queensland and the Northern Territory, the value of the yield in 1914 being about 28,000*l*. Some quantities of tortoise-shell are also obtained in the north of Australia.

273. These special fisheries gave employment to some 4,150 men in 1914, and the value of the pearls, pearl-shell, bêche-de-mer, and tortoise-shell obtained was 416,000*l*. The general fisheries (wet fish, lobsters, oysters, &c.) employed about 7,800 men in 1914, whilst the catch was valued at nearly 600,000*l*. In 1914-15 the value of fish imported into the Commonwealth was 806,000*l*.; of this total 661,000*l*. represented the value of tinned fish, shipped chiefly from the United States, the United Kingdom, Scandinavia, and Canada. Small quantities of fresh fish were imported from New Zealand.

GOVERNMENT ASSISTANCE TO FISHERIES.

274. In the Commonwealth fish is regarded as a luxury rather than as a staple article of diet, and the consumption per head of the population is much less than in such countries as the United Kingdom, Canada, and Norway.† Difficulties of distribution and irregularity of supply have contributed to produce this

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* *See* Report and Recommendations of Royal Commission on Pearl Shelling, Commonwealth Paper, No. 326 of 1916.

† Year Book of the Commonwealth of Australia, No. 8, p. 39.

result.* The number of experienced fishermen is small, and immigrants have been attracted to other pursuits, with the result that fisheries have become a field for casual rather than regular employment. We are glad to observe, however, that the Commonwealth Government has been devoting attention to the possibilities of the industry. A Director of Fisheries was appointed eight or nine years ago in order to carry out investigations as to the supplies of fish in Australian waters and the best method of carrying on the industry, and also to survey and chart fishing grounds. An investigation vessel on the lines of a modern trawler was built in the Commonwealth and fitted with laboratory and special apparatus. This vessel made nearly a hundred cruises between 1909 and 1914 and collected much valuable information as to fishing fields in Australian waters, but was unfortunately lost at sea at the end of 1914. The Governments of the various States have also undertaken work in carrying out fishery experiments and in fostering the industry. There appears to us to be room for co-operation and coordination of work not only between the States themselves, but also between the States and the Commonwealth Government.

275. The Federal Government allows a bounty of ½*d.* per pound on fish preserved or canned in Australia, but the amounts paid have hitherto been very small. There are only five factories preserving fish, and the amount of bounty in 1914-15 was only 156*l.*

New Zealand.

276. During our visit to the Dominion, no special evidence on the subject of New Zealand fisheries was tendered to us, but we have received various statistics

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* The Government of New South Wales has recently commenced a State trawling industry and has established depôts for the retail distribution of fish.

from the Government and have also obtained much valuable information from a report by Professor E. E. Prince, Canadian Commissioner of Fisheries, who, at the request of the New Zealand Government, made a very careful investigation of the subject in 1914. In his preliminary report* he points out that the fisheries of New Zealand have not advanced so rapidly as those of some of the other Dominions, notably Canada. At present the consumption of fish in New Zealand is only about five pounds per head per annum, as compared with 25 pounds per head in Canada.

CHIEF VARIETIES OF FISH.

277. The most common and important food fish of Canada and Northern Europe, such as herring, haddock and cod, are not found in the New Zealand fishing grounds. The principal species in New Zealand waters include, however, many exceedingly good fish, resembling those caught on the shores of the Mediterranean. Amongst important edible fish of New Zealand may be mentioned the so-called blue cod; this fish, which neither resembles cod nor belongs to the cod family, is in large demand as an article of food, and after being cured and smoked is exported in considerable quantities to Australia. The hapuka or groper, a very much larger fish, is also largely caught for sale in the New Zealand markets. Other food fishes of importance are the red snapper, the barracouta, the sea-bream, mullet and gurnard. Bass and trout have been introduced into the rivers and lakes of the Dominion. These have flourished since their introduction and exceeded in size the varieties in the United Kingdom and America from which they were derived.

278. There are important oyster beds off the coast, those situated in Foveaux Strait being especially

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* New Zealand Government Paper H. 15c of 1914.

valuable. A delicately flavoured oyster, the rock oyster, is found adhering to the rocks on many parts of the coast.

279. The whaling industry of New Zealand, which was formerly of much importance, has declined, and Professor Prince has called attention to the wasteful manner in which it is carried on. Similarly, sealing, which flourished greatly in the 19th century, is now carried on only to a very limited extent amongst the small herds which still exist to the south of the South Island.

POSSIBILITIES OF DEVELOPMENT.

280. No regular statistics of the catch of fish in New Zealand waters are collected. Figures were obtained in connection with the census of 1906 which showed a total value of some 70,000*l*. In a paper which appeared in the Transactions of the American Fisheries Society for June 1916, Professor Prince states that the annual value of New Zealand fish caught probably does not exceed 100,000*l*., including about 40,000*l*. worth exported mainly to Australia. He states that only about 1,500 or 1,600 persons are engaged directly in fishing or handling fish, about 1,000 of these being actual fishermen. There is, however, ground for believing that with proper assistance to the development of the fisheries, and with suitable methods of conservation, the industry is capable of great expansion.

Union of South Africa.

281. The fishing industries of the Union of South Africa are, at the present time, of relatively small importance, and have attracted much less of the energy of the population than mining and agriculture. The census of 1911 showed that the fishing industry gave employment to 3,900 persons only, about one-fourth of whom were Europeans. There were also four fish-curing establishments, all in the Cape Province, which

employ a total of 183 persons. In addition to 550 row boats there were only 44 steam and 39 sailing vessels engaged in fishing.*

The census for 1911 also showed that the catch of fish—all in Cape Colony and Natal—represented an annual value of 180,000*l*. In addition the whale fisheries showed a yield of 90,000*l*.

The Union has in recent years developed an export trade in fish (especially dried and preserved fish), and in 1913 the total value of such exports exceeded 100,000*l*.

CHIEF VARIETIES OF FISH.

282. The principal edible fish caught off South African coasts are the snoek, sole, silver fish, kabeljauw, panga, and seventyfour, the latter being mainly confined to the Natal coasts. Other fish are the geelbek—a large fish averaging about 10 lbs.—mackerel, oysters, and stock-fish. Excellent crayfish are found off the coasts of the Cape Province, and attempts have been made at various times to establish a canning industry.

283. Outside Cape Town the most important fishing station in the Cape Province is East London, where over 400 persons are employed in fishing; considerable quantities of frozen fish are regularly railed inland to the Transvaal and the Orange Free State. At Port Elizabeth the fishing industry gives employment to about 200 persons, whilst a smaller but improving industry is carried on at Mossel Bay.†

WHALING.

284. In Natal the whaling fishery predominates in importance. According to the Report of the Natal

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* Census 1911, Part X., pp. 1414-5. U.G. 321-1912.

† Province of Cape of Good Hope. Report of Fishery Officer. [C.P. 1-14.]

Fishery Department for 1914 the number of whales captured in that year was 1,061, as compared with 1,344 in 1913. The value of the products obtained was 117,000*l*. in 1914, as compared with 137,000*l*. in 1913.*

We received evidence in Durban from representatives of the whaling interest of South Africa, who advocated investigation into the manner in which the industry is carried on, not only in the South Atlantic but in other parts of the world. We understand that a Committee on Whaling has been at work in London for some years past, under the auspices of the Colonial Office, dealing with problems connected with the whale fisheries of South Georgia and other dependencies of the Falkland Islands. We think that the information collected by this Committee should be of considerable assistance to the Union Government.

FRESH-WATER FISHERIES.

285. Little attention has been paid so far to the fresh-water fisheries of South Africa, and very little is known on the subject. Steps have, however, been taken to stock certain rivers in various parts of the Union with carp and trout. Owing to the uncertain flow of most of the large rivers in the Union we fear that there is only a limited field for successful work in this direction.

Newfoundland.

286. In no part of Your Majesty's Empire does the fishing industry play a greater part in the economic life of the population than in Newfoundland; it is, in fact, the mainstay of the Colony. The value of the exports of fishery products from Newfoundland during the five years ended 1913 averaged 2,000,000*l*. annually, or over 8*l*. per head of the population.

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* Province of Natal. Report of Fisheries Department, 1914 [N.P. 4, 1915.]

CHIEF VARIETIES OF FISH.

Cod.

287. Of the fish on which the industry depends, cod is the most important and valuable. The products of the cod fisheries represent quite 80 per cent. of the total output of the fishing industry. For the following account of the Newfoundland cod fishery we are mainly indebted to the interesting and valuable evidence* supplied to us by the Hon. W. Carson Job, M.L.C.

288. The Newfoundland cod fishery has three branches; these are, in order of importance, the shore fisheries, the Labrador fisheries, and the Bank fisheries. The shore fishery is carried on from small settlements along the 6,000 miles of coast-line, mainly by means of traps formed of netting set in the sea in suitable positions near the coast, and, to a less extent, by means of line fishing. The use of motor boats has been introduced into the industry during the past few years with great success; they have been used mainly to enable fishermen to attend to the traps in rough weather, but they are also being used for actual fishing. The shore fishing is carried on for five months of the year, from June to October, and yields about two-thirds of the total Newfoundland catch of cod.

289. The Labrador fishery is carried on between June and September by parties of Newfoundlanders who settle for the summer months of the year in harbours along the coast of the mainland. They catch their fish by means of traps and cure it in their temporary settlements. Fishing is also carried on by schooners working along the coast and setting traps in different localities. Owing to lack of bait, fishing along the Labrador coast is carried on entirely by means of traps.

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* [Cd. 7898], pp. 39, *ff*.

290. The Grand Bank Fishery is engaged in by sailing vessels carrying some 12 to 20 men; after reaching the fishing stations the men go off in small boats and set trawls or lines, which carry some 3,000 hooks with baits, in suitable positions near the ship. The catch of fish is sometimes sold fresh (wet salted) in the United States markets, but is more usually taken to Newfoundland for curing. This industry is at present entirely dependent on the supply of bait, and we called attention in our Fourth Interim Report to certain problems in this connection.*

Lobster.

291. Probably the lobster fishery is the next in importance to the cod fishery. The catch has attained an annual value of 100,000*l.*, but the industry has declined considerably lately owing to the depletion caused by reckless methods of fishing. The Government is, however, giving attention to the question, and it is hoped that the lobster industry may regain its former importance. The lobster fishery is carried on all round the coast of Newfoundland, and lobsters are canned at small factories employing only three or four hands.

Seal.

292. The seal fishery, the yield of which varies considerably from year to year, averaged about 50,000*l.* a year in the 10 years ended 1914, and is carried out on the eastern coast of Newfoundland, and also in the Gulf of St. Lawrence, by a fleet of small steamers. The skins are not of value as a fur, but are sold for making fancy leather, &c. Oil is also extracted from the flesh, and forms a considerable article of export.

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* [Cd. 7711], p. 7.

Herring.

293. The herring fishery of Newfoundland is mainly conducted on the west coast between the months of October and January partly by means of small nets set in shallow waters. There are no deep-sea herring fisheries off the coast of Newfoundland. The Newfoundland herring is of particularly good quality, and there appears to be a considerable field for the expansion of the herring fishing industry, though the arrival of shoals is rather uncertain.

Other Fish.

294. Salmon is caught freely in Newfoundland waters, but realises a very small price. If proper cold storage arrangements were available to carry the fish to the principal markets, the salmon fisheries could, we believe, form an important industry.

295. The whale fishery of Newfoundland has declined greatly during the last ten years, and the value of whale oil exported has similarly fallen off. It was stated to us that about twelve years ago too many vessels engaged in the trade, with the result that the whale was nearly exterminated.*

GOVERNMENT ASSISTANCE.

296. We are of opinion that the Government could take very useful action by affording to the fisheries more assistance and protection than they already receive, and by arranging for adequate scientific investigation of the various fishing grounds of the Colony. We suggested in our Fourth Interim Report that such investigation should be carried out in co-operation with the Government of Canada.†

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* Job. p. 42 of [Cd. 7898].

† p. 17 of [Cd. 7711].

WATER POWER.

297. The water powers of the Dominions, especially of Canada and New Zealand, are great, and as they provide a cheap, convenient, cleanly, and inexhaustible form of energy, their potentialities in respect of industrial development are immense.

Canada.

298. This development is already making rapid progress in Canada, not only in the substitution of the new form of energy for the old, but in the establishment of new industries which, by the aid of water power, are utilising the natural resources of the country.

This progress cannot fail to be equally great in the immediate future, and it is fortunate, therefore, that the title to the Water Power Rights has largely remained under the control of the Dominion or Provincial Governments. The Dominion Government controls navigable streams and their water powers throughout the Dominion and the water powers in general of the Prairie Provinces, while the administration of these powers in the other Provinces is under Provincial control.

The statutory authorities responsible for the conservation and the utilisation of these water powers appear to perform their duties with the utmost care and efficiency, appreciating, as they do, the enormous value of this asset to the Dominion.

299. The authorities concerned have issued from time to time so many publications giving detailed information as to the developed and available powers of the different Provinces that it is not necessary to mention here more than a few salient facts.

It is officially stated that the water power actually developed throughout the Dominion in 1915 amounted to 1,712,000 horse-power for 24 hours daily, while it is estimated that within areas that may reasonably be expected to be populated in the near future, there are water possibilities aggregating more than ten times as much.

300. Naturally attention has first been given to the large water powers in Ontario and Quebec which represent three-fourths of the whole power yet developed in the Dominion, a most fortunate possession for these Provinces, inasmuch as they are, so far as is yet known, entirely without coal. The existing and possible sources of this power are Niagara Falls and Rapids, the Rapids of the St. Lawrence in both Provinces, the Ottawa River, the St. Maurice, the Saguenay, &c.

Owing to the natural system of lake reservoirs, the variations of water flow on the Niagara River and the St. Lawrence River are remarkably small; but elsewhere, as in those parts of the country where from climatic causes the flow in winter is greatly reduced, while at the melting of the snows in spring it is enormously increased, artificial reservoirs have been constructed to regulate the flow.

301. The water power developed in the two Provinces of Quebec and Ontario amounted in 1915 to 1,309,000 24-hour horse power, but the total amount available from the sources just indicated is estimated at 8,404,000 horse power for 24 hours daily. This power, of course, could never be wholly utilised, for when there was a maximum demand for power there would be a minimum demand for lighting, and *vice versâ*, but if 80 per cent. of this power were developed and only one-fourth of the power thus developed consumed, the result would be a saving in fuel equal to the whole of the coal now consumed throughout the Dominion.

302. In some of the memoranda accompanying the minutes of evidence taken in Canada, we have noted the remarkable industrial development of various cities

and districts in the Dominion well supplied with water power,* and no better illustration of this can be found than at Shawinigan Falls where there is quite a remarkable variety of industries and an ever increasing population.

Remarkable also is the development and wide distribution of electrical energy under the Hydro-Electric Commission set up by the Government of the Province of Ontario and its application to industrial, lighting, and agricultural purposes.

303. British Columbia is rich in both water power and coal; nevertheless, rapid progress is being made in hydro-electric development.

The Maritime Provinces are only moderately endowed with water power, some of which would be available for only eight months in the year; but this is of the less consequence as they are so near the great coal-fields of Nova Scotia.

The information with respect to the other Provinces is not complete, but sufficient development has been effected for present needs. For example, the City of Winnipeg has developed considerable electric energy from the large sources of power which are found on the Winnipeg River. In most districts there are numerous smaller sources of power which can be utilised for future requirements.

304. It is obvious, therefore, that Canada has within her own borders ample power for any industrial development which can at present be foreseen, and which, in any circumstances, must inevitably be great.

This is altogether apart from what may yet be found in the north and north-west, where nothing has been developed and practically nothing surveyed. In this respect it may be enough to say that the Nelson River, which has enormous possibilities, drains an area of 450,000 square miles.

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* *See* pp. 315–337 of [Cd. 8459].

Australia.

305. The only evidence which we had in Australia relative to water power was given on behalf of the Complex Ores Company* who had obtained authority to harness the waters of the Great Lake in Tasmania and of the Rivers Ouse and Shannon connected therewith, and who told us that the waters thus impounded would provide energy enough not only for their own purposes, but for all the industrial requirements of the island. At the time of our visit the works were in progress but had not reached the stage of operation.

306. We have since, however, learned that the Company disposed of its concessions and works to the State of Tasmania in October, 1914, that the latter, in spite of delays and difficulties caused by the War, successfully completed the enterprise and commenced work in May, 1916, that some 10,000 h.p. can be generated immediately with the present installation, and transmitted to Hobart for any purposes for which electrical energy is required, and that the power can readily be increased to 25,000 h.p., and ultimately to 70,000 h.p., as soon as it is required. We congratulate the State of Tasmania on the enterprise which has brought the scheme to a successful issue, and we think that its effect should be greatly to assist in the establishment of mining, metallurgical, chemical, and other industries in the island.

307. No doubt steps will be taken later on to utilise the power of the Barron Falls near Cairns, Queensland, which some of our members visited during our stay in Australia, but we have been unable to discover that any practical steps have been taken in this direction, or that an estimate has been made of the available horse-power.

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* P. 195–197 of [Cd. 7172].

New Zealand.

308. The water powers of New Zealand in relation to possible demand are practically unlimited, one competent witness telling us that they are much more than adequate to provide electric energy for the efficient working of all the industrial plants and all the railways in the North and South islands.* The available power is estimated at 3,817,000 horse power, some of which would be from various causes very costly to develop, but the greater part would be developed on such moderate terms that the electric energy produced could be sold at rates as low as those prevailing in any part of the world. Of the whole available power only 43,000 horse power were being utilised in 1915, and of this latter figure only 33,400 horse power were converted into electric energy, the balance being used for water wheels, sluicing purposes, &c.

309. The Dunedin City Council has the largest municipal plant in use. Since 1907 it has had a power station on the Waipori River, 32 miles away, for supplying light, power, heating, &c., to the city.

The Dominion Government, who since 1908 have reserved the water rights, have recently initiated a more active policy and have erected a power plant at Lake Coleridge for the provision of electric energy for the lighting of the city of Christchurch, for its industrial requirements, and for the working of its street railways.

In the North Island a large and comprehensive scheme is now under consideration for the supply of electric energy, to be generally available in all the chief towns and districts in the Island.

The resources of New Zealand in this respect are undoubtedly of immense potential value.

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* Parry, Q. 3122, p. 201 of [Cd. 7170].

Union of South Africa.

310. The machinery at the Lydenburg and Barberton goldfields is, for the most part, driven by electric power derived from local waterfalls, but the extent of this development is small.

It is also possible to produce electric energy at various points on the Vaal and Orange Rivers, and the Mooi Rivers of Natal and the Transvaal. These may be made available to a moderate extent for industrial expansion, but it cannot be said that any development of importance has been made, or is likely to be made, in the early future.

Whether the day will come when it will be possible to harness the waters of the Zambesi at the Victoria Falls, and convey power for industrial use is a fascinating speculation, but with the abundant supply of cheap coal in the Transvaal and Natal, accessible from all points, the scheme is not likely to be carried out for mining or industrial purposes in the Union.

Newfoundland.

311. From the evidence presented to us in Newfoundland, it appeared that no surveys of the rivers, and therefore no estimate of the water powers available for conversion into electric energy, had been made, but it is obvious to anyone travelling through the Island that these are of very considerable importance.

There are about 6,000 horse power thus converted for lighting the larger towns, for supplying power for manufacturing and other purposes, and for operating the street cars in St. John's.* But much the largest part of the power developed is used in the pulp and paper mills—this amounting to 54,000 horse power in

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* Turner, Q. 1351, p. 80 of [Cd. 7898].

1914,* and in view of the enormous extent of the forests available for pulp making, it is not unlikely that there may be a demand for a much larger amount of power. We should, therefore, be glad to hear that a complete survey of the rivers of the Island had been made, so that its possibilities for the production of hydro-electric energy might be accurately determined.

CHAPTER V.—CONTROL OF NATURAL RESOURCES DURING THE WAR.

312. So far we have concerned ourselves only with the productivity of the self-governing Dominions, and have contented ourselves with indicating certain specific matters in which development is needed, or where more energetic measures are demanded, in order to maintain output or prevent exhaustion of resources.

It seems obvious, however, that some wider policy will be required so that, when normal conditions return, the Empire may be able to reap the benefit of its special effort to utilise its resources during the War, and may permanently profit by the mutual help which each part has rendered to the others.

313. We propose, as a preliminary to our suggestions regarding the lines which such policy should take, to review briefly the action so far adopted by Your Majesty's Government and the Dominion Governments during the War, in developing and controlling their resources for the common benefit. We have watched with the closest interest how the Dominions have done their utmost to place at the disposal of Your Majesty's Government their resources in the way of food and raw materials, and to co-operate in all matters relating to the manufacture and the exportation of their products, with the dual object of preventing the enemy from receiving supplies and

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* Id. *loc. cit.*

of securing that Your Majesty's Government and the Allied Governments receive the supplies which they require.

314. In its broadest aspect the policy has been to establish prohibitions of exportation coupled with a system of licensing, so as to ensure that so far as necessary the whole of the exports of commodities essential for the War should come under Government control both as regards quantities and destination. In many cases, however, still more energetic action has been necessary in order to secure the absolute command of certain classes of goods.

We note some of the most outstanding examples which have occurred during the first two years and a half of the war.

Food Supplies, &c.

WHEAT.

315. Large purchases have been made on Government account in Australia and Canada, and in the autumn of 1915 the Canadian Government took steps, as a temporary measure, to requisition, on the part of one of the Allied Governments, a large amount of grain.

The Commonwealth Government went further, and for the season of 1915-16 created machinery whereby the shipping and marketing of the entire Australian crop was entrusted to a Board of Control representing the Commonwealth and States Governments, working in conjunction with a similar Board in London. Advances were made to the farmers for their crops, the necessary financial arrangements being concluded with the Australian banks, and it was arranged that the balance realised should be paid to the producers at the end of the season after deduction of freight insurance and cost of handling.*

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* For full particulars, *see* pp. 37-8 of [Cd. 8285] Report of British Trade Commissioner in Australia for 1915.

MEAT.

316. At a very early period in the War, legislation was passed by the States of Queensland and New South Wales to secure for the United Kingdom and the Allies the whole of the available supplies of beef, mutton, and lamb. Administrative action to the same end was taken in Victoria and South Australia, the two other meat-exporting States of the Commonwealth, and in New Zealand.

Arrangements were made with Your Majesty's Government for the meat to be purchased by the Board of Trade for the supply of the British and Allied armies, and, in respect to the surplus, for the civilian population of the United Kingdom. Control was further effected when Your Majesty by Order in Council,* in the exercise of Your prerogative right, requisitioned all the insulated space on the steamers trading between the United Kingdom, the Commonwealth, and New Zealand, thereby securing for the Governments concerned effective supervision not only over the meat supplies, but also over butter, fruit, and other perishable produce.

CHEESE.

317. As pointed out in statistical tables which we have published,† Canada and New Zealand together supply some 80 per cent. of the total imports of cheese into the United Kingdom. They provide, in fact, together nearly three times as much as the total home supply of the Mother Country. Large purchases have been made by Your Majesty's Government in Canada and through the New Zealand Government direct, as in the case of meat.

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* Order in Council of 13th April 1915.

† P. 6 of [Cd. 8123].

WOOL.

318. Ever since the outbreak of war, concerted measures have been taken to supervise closely the destination of the wool clip, not only of the United Kingdom, but of Australia, New Zealand, and the Union of South Africa.

Thus in New Zealand, of which the clip is practically wholly crossbred wool, exportation to destinations other than the United Kingdom was until recently permitted only under exceptional circumstances and for strictly limited amounts. Similar action was taken in connection with the crossbred wool in Australia, and the destinations even of merino wool from Australia and the Union of South Africa were closely scrutinised before exportation was allowed, though this type of wool was not so suitable for military uses.

A special organisation was created to deal with consignments, whether of merino or crossbred wool, from nearly the whole of the British Empire to the United States of America.

In the latter part of 1916 further action became necessary. Your Majesty's Government requisitioned the whole of the United Kingdom wool clip for the year, in order to safeguard the supply required for the needs of the army, and also arranged to purchase all the 1916 clip of Australia and New Zealand.

TALLOW, GLYCERINE, ETC.

319. So important is the use of tallow and other fats suitable for the manufacture of glycerine, and still more the use of glycerine itself for purposes connected with the War, that special measures have had to be taken to control their production and export.

In the case of tallow, of the imports of which into the United Kingdom, Australia, and New Zealand together supply over 60 per cent.,* it has been necessary carefully to control the exports from both the Commonwealth and the Dominion.†

In the case of glycerine, we are informed that arrangements had to be made to requisition the whole output of the United Kingdom in respect both of crude and refined glycerine, and corresponding action to control all available supplies has been taken both in Australia and the Union of South Africa.

Shipments of palm oil from British possessions in West Africa to foreign countries are allowed only on conditions which ensure that the equivalent of the glycerine content of the oil is returned to the United Kingdom.

Minerals.

GOLD.

320. Immediately on the outbreak of war, the Government of the Union of South Africa prohibited the export of gold, except with its consent, and held all available supplies to the order of Your Majesty's Government.

COPPER, LEAD, AND ZINC.

321. The most outstanding action taken by any Dominion Government since the War in the way of controlling supplies, is undoubtedly that of the Commonwealth Government in connection with the base metals of Australia.

It was found that there were contracts with German companies, for the most part with suspensory clauses in event of war, covering nearly the whole of the Australian output of copper, lead, and zinc.

Drastic measures were taken, both administrative and legislative, to put an end to this state of affairs.

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* Page 11 of [Cd. 8123].

† *See* Commonwealth Gazette, No. 28, 24th Feb., 1916, and No. 35, 16th March 1916.

The Commonwealth Government passed legislation early in 1915 annulling those of the contracts in question which were made in Australia, and action was taken by Your Majesty's Government in 1916 dealing similarly with the most important of the remaining contracts.

Further, a Metal Exchange has been established in Australia which includes amongst its functions the registration of all sales and purchases of base metals and minerals for export or for consumption beyond the Commonwealth. Membership of the Exchange is confined to natural-born British subjects domiciled in Australia. Further, the policy has been definitely adopted of securing, as far as possible, the refining within the Commonwealth, or in British or Allied countries, of all Australian base ores.

Finally, action has been taken in co-operation with Your Majesty's Government to secure for the Mother Country an adequate supply over a series of years of the zinc concentrates from Broken Hill for treatment in the United Kingdom, as well as a considerable tonnage of spelter which may have been refined within the Commonwealth itself.

WOLFRAM, SCHEELITE, AND MOLYBDENITE.

322. At a comparatively early period in the War, action was taken to purchase on account of Your Majesty's Government the available supplies of molybdenite in Canada, of wolfram ore and molybdenite in Australia, and of scheelite in New Zealand.

So important was it thought to secure for the purposes of the War the supplies from the Dominions and elsewhere of these ores which are essential for the manufacture of high-speed steel, that a fixed price was offered for the output, calculated, we understand, to serve not only as adequate remuneration for existing supplies but also as a stimulus to production.

We are informed that fixed prices are still being paid for the Australian and New Zealand production of wolfram ore and scheelite, these tungsten-bearing ores being the two thought most essential for the purposes of Your Majesty's Government.*

NICKEL.

323. The Dominion of Canada, as we have shown, produces 80 to 85 per cent. of the world's supply of nickel ore. New Caledonia is the only other country which contributes any considerable proportion of the supply.

Nickel is an indispensable material for the production of armour plating and munitions of war, and it is also very valuable for many articles of commercial manufacture.

Hence special concerted measures became necessary to supervise the destination during hostilities of the ore exported from the Dominion to the United States and to prevent it from reaching the enemy.

Further, the war has called attention to the desirability of developing the refining of nickel ore in Canada where hitherto it has only been converted to a matte, and in 1915 a Royal Commission was appointed by the Government of Ontario specially to report on the resources, industries and capacities of nickel and its ores in the Province, including the question of local refining. We also understand that the International Nickel Co., which previously had its refinery in New Jersey, is arranging to erect additional refining machinery in Canada, whilst another company, the British America Nickel Corporation, under arrangement with Your Majesty's Government, is also establishing a smelting and refining plant in the Province of Ontario.

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* In order to deal with the purchases of meat, cheese and scheelite, the New Zealand Government has established a special office in the Dominion known as the Imperial Government Supply Department.

ASBESTOS.

324. The deposits in the Province of Quebec are, as we have shown in our Fifth Interim Report,* the chief source of the world's supply of asbestos, and its use for industrial purposes has developed greatly in the last decade.

The importance of asbestos for the service of the War is obvious, and special measures have been taken in Canada both to encourage the supply to the United Kingdom of the amount required for her needs, and to prevent the large quantities which normally go to the United States from being re-exported for hostile purposes.

These measures hinge on the requirement of a guarantee from manufacturers in the United States that they will use the asbestos supplied to them for local consumption only, and we understand that a similar guarantee is required from importers in the United States of asbestos from the Union of South Africa.

COAL.

325. Only gradually was it realised how vital was the need, and far-reaching the result, of controlling coal supplies.

Experience showed that the supply or withholding of bunker coal was a most effective means of directing trade during the War.

We look upon the control of bunker coal supplies as of the greatest economic importance to Your Majesty's Government and the Dominion Governments not only at the present time but for the future.

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* Pp. 46–7 of [Cd. 8457].

Forest Produce.

PIT PROPS.

326. The outbreak of hostilities caused immediate diminution of the supplies of pit props usually obtained by the United Kingdom from the Baltic, particularly from Russia, and energetic measures became necessary to look for new supplies to supplement the inadequate resources of the Mother Country.* A Commission was sent to Newfoundland and Canada to investigate the situation, and reported favourably on the prospect of obtaining supplies from these parts of the Empire. Though transportation difficulties have presented serious obstacles during the War, many efforts have been made, and with considerable success, to open up the trade.

Legislation has already been passed in Newfoundland permitting the exportation of pitwood during the War, though at present the concession is limited to this period and to six months after, and an export duty is still imposed. Previously, however, the exportation of pitwood was forbidden altogether for the sake of encouraging the wood pulp industry.†

CHAPTER VI.—CONSERVATION AND DEVELOPMENT OF NATURAL RESOURCES IN THE FUTURE.

327. We have dealt on the action taken during the war to stimulate and control supplies of foodstuffs and raw materials because it illustrates the immense power which the Governments of the United Kingdom and the Oversea Dominions can exert to control the course of trade and the development of natural resources when necessity arises. But the measures we have described and many others of a similar nature have

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* For the statistics, *see* p. 74 of [Cd. 8123].

† *See* p. 8 of [Cd. 7711.]

not formed part of any co-ordinated efforts or maturely considered scheme; they have been dictated from day to day by the urgent and changing needs of the moment.

328. The success of the action achieved during the War suggests that it is expedient that the various Governments of the Empire should take steps, as soon as conditions permit, to secure the development and utilisation of their natural wealth on a well-considered scheme directed towards a definite and recognised object. In our opinion it is vital that the Empire should, so far as possible, be placed in a position which would enable it to resist any pressure which a foreign Power or group of Powers could exercise in time of peace or during war in virtue of a control of raw materials and commodities essential for the safety and well-being of the Empire, and it is towards the attainment of this object that co-ordinated effort should be directed.

329. Before any adequate measures can be taken towards this end, a preliminary survey is needed of the relation between Empire production and Empire requirements throughout the whole range of articles needed for the sustenance and well-being of the people, for the maintenance of industry, and for the production of munitions of war. So far as we know, such a survey has never yet been undertaken. In the "Memorandum and Tables relating to the Food and Raw Material Requirements of the United Kingdom,"* which were submitted by us to Your Majesty in 1915, a partial effort was made in this direction by the present Commission, but these tables considered consumption within the United Kingdom only and were confined to the more important articles of commerce, the facts in regard to which were readily ascertainable.

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* [Cd. 8123.]

In these tables no attempt was made to record the total production within the Empire.

330. The experience of the present war has shown, however, that important industries satisfying military and other vital requirements are dependent on many materials, the trade in which is relatively small and the imports and exports of which are not recorded in the official returns. For example, the United Kingdom trade returns, as we have shown, contain no record of the imports of nickel or tungsten ore.* We regard as urgent a survey on a wider and more precise basis.†

331. The result of a full survey should divide the necessary materials of trade and commerce into three main categories:—

(1) MATERIALS OF WHICH THE WORLD'S REQUIREMENTS ARE MAINLY OR WHOLLY PRODUCED WITHIN THE EMPIRE.

(2) MATERIALS OF WHICH THE EMPIRE'S REQUIREMENTS ARE APPROXIMATELY EQUALLED BY EMPIRE PRODUCTION.

A subdivision of this class embraces certain raw materials which are produced in sufficient quantities within the Empire, but which have been sent in the past to foreign countries for treatment or refining before final utilisation.

(3) MATERIALS OF WHICH THE WORLD'S REQUIREMENTS, AND WITH THEM THOSE OF THE EMPIRE, ARE NOW MAINLY PRODUCED AND CONTROLLED OUTSIDE THE EMPIRE.

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* [Cd. 8123], p. 10.

† As showing the nature of the task to be undertaken we have collected in Appendix I. the essential facts in regard to certain materials and other articles. For assistance in its preparation we have to thank the officers of various Government departments in the United Kingdom and the Dominions, and Mr. G. T. Holloway, chairman of the Ontario Nickel Commission. The materials contained in this Appendix are, however, to be regarded as examples rather than as an exhaustive survey.

332. Obvious and simple as a classification on these lines may appear, no systematic and scientific attempt has ever been made to apply it to the various foodstuffs and raw materials required by the Empire. The distinctions which we make are, of course, not absolute, nor are the classes divided from each other by any rigid limits; important articles may occupy an intermediate position between some of the classes. Further, the development of new sources of supply and the progress of industrial discovery may cause frequent transitions from one class to another. The position, therefore, cannot be regarded merely statically. It should be the duty of some body or department to collect from year to year information as to the requirements of the Empire in respect of all commodities essential to its development, safety and well-being, and as to the output actual and potential, and to watch carefully any tendencies towards change. Action of this kind lies at the root of any endeavour towards a wise utilisation of the resources of the Empire, and it should, in our opinion, form one of the most important duties of the Imperial Development Board whose creation we propose in Chapter XIV. of this Report.

333. We proceed to consider the nature of the action needed towards the maintenance and development of supplies of commodities of each of these three classes which we have suggested.

1.—MATERIALS OF WHICH THE WORLD'S REQUIREMENTS ARE MAINLY OR WHOLLY PRODUCED WITHIN THE EMPIRE.

334. We doubt whether it was realised before the War that the Empire had substantially a monopoly of

the world's production or distribution of certain most valuable commodities of commerce. Even if the fact were dimly recognised no effort had been made by the Governments of the Empire individually, or in co-operation, to use these commodities to their commercial advantage.

Canada produces much the largest proportion of nickel, cobalt, and asbestos, and, in conjunction with India, of mica.

New Zealand produces practically the only supply of kauri gum and phormium fibre.

The Union of South Africa has the virtual monopoly of diamonds and ostrich feathers.

India has a monopoly of jute, whilst the West African Colonies yield the major portion of the world's supply of palm nuts and palm kernels, and the Eastern Colonies of plantation rubber.

The British Empire produces about 40 to 45 per cent. of the world's total supply of wool. If merino wool only is taken, the proportion is much higher. The Empire also produces over 60 per cent. of the world's output of gold.

General Principles.

335. It is probable that in the case of articles falling within this category no extraordinary measures are necessary to stimulate production. The Empire's needs are fully met, and a large export trade is carried on with the outside world. It is not difficult, however, to imagine conditions, even in times of peace, in which it might become desirable to use the possession of these assets as an instrument of commercial negotiation. The practical monopoly of potash which Germany possesses has enabled her to exert pressure on other countries in the past, and the controversy between

Germany and the United States in 1911 may be mentioned as an example of the influence which the possesion of a raw material monopoly gives in commercial negotiations between two Powers. The possession of assets such as the Canadian asbestos and nickel supplies could be used by the British Empire as a powerful means of economic defence.

Special Action in Particular Cases.

336. We desire, however, to point out that although Canada is practically the only producer of raw asbestos on a large scale in the world, the United Kingdom is largely dependent on outside sources, especially the United States, for the manufactured asbestos which it requires; even Canada imports manufactured asbestos to the average value of 70,000*l.* a year. We draw the attention of the Canadian Government to this position, as it sems to us that a large and important industry in the manufacture of asbestos might be developed in the Dominion.

337. Similarly Canada produces about three-quarters of the world's supply of nickel; before the War, however, the refining of the metal was, as we have seen, carried on entirely outside the Dominion, the matte produced by the International Nickel Co. being shipped largely to the United States for that purpose, whilst that produced by the Mond Nickel Co. was sent to South Wales. The control of a large part of the Canadian deposits by a United States company, and the manufacture by the latter of nickel and nickel alloys, gave rise to considerable agitation in Canada after the outbreak of war. The Canadian Government has, as we have shown, taken action to avoid the dangers which might arise from foreign control of the use of nickel ores, and measures have also been taken to secure the erection of refineries in the Dominion. The maintenance and development of this policy seem to us essential in the interests of the Empire.

2.—MATERIALS OF WHICH THE EMPIRE'S REQUIREMENTS ARE APPROXIMATELY EQUALLED BY EMPIRE PRODUCTION.

338. The second category embraces many staple foodstuffs and commodities of which the production is widespread both in the Empire and elsewhere. In many cases the position is that whilst the Dominions are self-supporting, the United Kingdom is not. Wheat, meat, butter, wool and cheese are examples of this kind.*

General Principles.

339. In the case of wheat the relation between Empire supplies and Empire requirements varies from year to year with the changing yields of crops, especially in Australia and India, where marked fluctuations occur. On the whole the production of wheat within the Empire appears to have been in recent years slightly less than its consumption.

340. For its meat supplies the United Kingdom is forced to draw more largely on foreign countries, especially South America. There appears to us to be clearly a case for the further stimulation of cattle breeding, sheep raising and the keeping of pigs not only in Great Britain and Ireland but in the Dominions, more particularly in Canada, where these industries are at present little developed, and, in our opinion, steps should be taken to encourage the shipment of pedigree stock from the United Kingdom to the Dominions. At the present time the United Kingdom exports cattle and sheep for breeding to the Argentine Republic in larger quantities than to all the Dominions put together. Under its mail contract

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* The essential facts with regard to supplies of each of these classes of goods, except meat, are included in Appendix I. For the position of the United Kingdom as regards meat supply, *see* pp. 3-5 of [Cd. 8123].

with the Union of South Africa the Union-Castle Mail Steamship Company undertakes to carry pedigree stock free of freight from the United Kingdom to South Africa. This provision, as we showed in our Third Interim Report,* has been attended by excellent results, and we should be glad to see similar clauses inserted in other mail contracts which may be concluded in the future.

341. We desire also to emphasise that, in our view, temporary measures of control will be required on the termination of the War in connection with the meat supply, &c., from the Dominions. Owing to the depletion of live stock resulting from the War there will be a shortage of beef, mutton, butter, and cheese over a large part of the continent of Europe, and unless special action is taken there may be a risk that Australian and New Zealand supplies will be diverted. We believe, therefore, that it would be sound as a temporary measure to continue the policy of Government control of refrigerated space in vessels trading to the United Kingdom from Australia and New Zealand. We would also lay stress on the need for care in the various parts of the Empire to guard against depletion of their stocks of breeding cattle.

342. We think also that, as a matter of broad policy, it is desirable that the Empire should make such arrangements within itself, as shall secure that the surplus of the Dominions' supplies of the articles we have already mentioned may be attracted to the United Kingdom. This policy, in our view, can best be carried out by the establishment of better harbours on the Empire trade routes, and, concurrently, by the existence of improved and cheaper shipping facilities. On both of these subjects we shall have more to say later on. Lastly it is, in our opinion, of much importance that the Dominions should prepare their

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* P. 31 of [Cd. 7505].

produce in the manner most suited to the requirements of United Kingdom consumers, and equally that the United Kingdom should give all possible facilities for the handling and marketing of Dominion produce. This latter subject is dealt with in detail in Chapter X. of this Report.

Special Action in Particular Cases.

343. We now proceed to consider the special cases in which materials are produced in the Empire in sufficient or approximately sufficient quantities for its needs, but have hitherto been shipped to foreign countries for treatment or refining.

ZINC

344. There is little doubt that sufficient zinc or spelter for the needs of the Empire is contained in the zinc ore and concentrates which it produces.* Australia alone has an output of zinc ores and concentrates averaging 500,000 tons per annum, and containing between 200,000 and 250,000 tons of metallic zinc, whilst there is an appreciable and growing production of ore in Canada. The difficulty lies, not in any deficiency of the output of ore within the Empire, but in the fact that the reduction processes have hitherto been caried on abroad. Practically all the Australian zinc concentrates were sent before the War to Belgium or Germany for treatment, and the Spelter Convention which controlled the output of spelter before the War was mainly under German influences. The whole of the zinc ore from British Columbia was smelted in the United States. The position was that the United Kingdom produced only a fraction of its consumption of spelter, which amounts to about 200,000 tons per annum.

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* *See* Appendix I.

345. We are glad to be able to say that this state of affairs is in course of remedy. Arrangements have been completed by Your Majesty's Government with the Zinc Producers Association of Australia for the purchase of 45,000 tons of virgin spelter and 100,000 tons of concentrates per annum for the period of 10 years, with the right to purchase an additional 50,000 tons of concentrates a year. This, of course, involves arrangements for the erection of plant for reducing the concentrates both in Australia and the United Kingdom.

346. Further, in Canada, a bounty for a limited period for the production of spelter has been provided by the Dominion Zinc Bounties Act of 1916,* the object being to encourage the erection of electrolytic refining works. As a result of this assistance and the great activity and perseverance of the Consolidated Mining and Smelting Co. at Trail, British Columbia, already some 15 tons per diem of practically pure zinc are being produced, with a certainty of considerable extension of output later on.†

347. It is difficult at the present time to say whether these measures are by themselves sufficient to prevent the risk of some part at least of the zinc ore, &c., produced in the Empire from passing outside its own control on its way from the Empire producers to the Empire consumers, and this is a matter which, in our opinion, should engage the serious attention of the Imperial Development Board to which we have referred. As an illustration of the danger to which we allude, we may mention that, before the conclusion of the arrangements with Australia which we have mentioned, it was publicly stated that the capacity for spelter production in the United States of America

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* The bounty is limited in any event to £83,000, and is not payable if the price received by the producer is 4*d*. or more per lb.

† *See* [Cd. 8459], p. 271.

would be, at the end of 1916, normally three times as large as the probable domestic demands, and that at the end of the war a large number of smelting works were likely to be suddenly extinguished unless arrangements could be concluded to smelt a very large portion of the Australian output in the United States.

TUNGSTEN ORE.

348. Of essential raw materials, one of the most outstanding at the moment is tungsten in its various ores, in particular wolfram and scheelite.

Before the War imports of the metal and its ores were not even separately recorded in the United Kingdom trade returns, but it is well known that the metal was obtained almost wholly from Germany, to which, as the trade statistics of the Dominions showed, almost all the ore was sent. It is said that by purchasing and treating the lower grade ores, which British firms would not buy, Germany gradually acquired control even of the best ore.

349. In the course of the War, as we have already had occasion to observe, Your Majesty's Government found it necessary to buy up the whole production of the ores in Australia and New Zealand, as well as in other parts of the Empire, and to supervise the arrangements for their treatment in the United Kingdom before they could be used for the manufacture of steel.

350. We think it most desirable that the principle of State purchase of tungsten ores should be maintained for a number of years after the War, and as at present practically the whole demand for the metal within the Empire lies in the United Kingdom, we suggest that arrangements to this end should be made direct by Your Majesty's Government in consultation with the Oversea Governments. The selling arrangements to the individual manufacturers could no doubt

be carried out on the same lines as those at present existing. It may, of course, be necessary for Your Majesty's Government to take further measures to maintain in the United Kingdom the tungsten manufacturing industry.

MONAZITE.

351. Prior to the War the control of deposits of monazite sand in various parts of the Empire and the manufacture therefrom of thorium nitrate, an essential requirement for the manufacture of incandescent mantles, were almost entirely in foreign hands. Since the outbreak of war the control of monazite deposits in Travancore, South India, has been transferred to the United Kingdom.[*] The production of thorium nitrate in the United Kingdom has simultaneously been developed, and we regard the position as satisfactory so long as there is no possibility of the monazite deposits in India again passing under alien control.

3.—ARTICLES MAINLY PRODUCED AND CONTROLLED OUTSIDE THE EMPIRE.

352. It is in this group of articles that the possibility of economic pressure from foreign countries controlling supplies of raw materials requires especially to be provided against, and that Government action is most needed in order to promote economic independence. In our opinion no general remedy applicable to all classes of goods exists; the action needed must vary in character with each article and the precise line to be taken in each case can only be suggested to the Governments interested after careful examination by the best expert authorities.

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[*] NOTE.—For the circumstances of this transfer, *see* Appendix I., pp. 446-7, under "Thoria and the allied and rare earths."

General Principles.

353. There are, however, certain general principles on which, in our opinion, such action should be based. In the forefront we place co-ordinated investigation and research with the object of increasing available supplies. Whilst action of this kind is most immediately necessary in the case of articles for which the Empire is at present dependent on foreign supplies, we think that it should also cover articles of which the supply from Empire sources appears to be in danger of diminution. The nature of the investigation and research should, in our opinion, depend largely on the essential character of the materials which, for this purpose, we divide into three main classes, viz.:—

(*a*) Wasting assets, *i.e.*, articles of which the supplies are not reproduced, *e.g.*, minerals.

(*b*) Articles of which supplies are reproduced slowly and, therefore, are in danger of exhaustion unless a proper ratio between wastage and production is preserved, *e.g.*, forest produce generally.

(*c*) Articles of which the supplies can rapidly be increased by extending the area and intensity of production, *e.g.*, agricultural produce.

We now proceed to suggest some of the lines on which, in our view, investigation should take place in regard to the three classes we have mentioned.

MINERALS.

Need for a Co-ordinated Mineral Survey of the Empire.

354. In the case of minerals, a properly co-ordinated mineral survey of the Empire appears to us to be an urgent necessity. We recognise the value of the work hitherto performed by the Imperial Institute in collecting and disseminating the results of mineral and geological surveys in various parts of the Empire and,

in some cases, of actively directing them. We have also seen the joint recommendations recently made by the Iron and Steel Institute, the Institute of Metals, the Institute of Mining Engineers, and the Institute of Mining and Metallurgy, for the systematic collection and co-ordination of information bearing on the use of minerals and their production, and the investigation of all questions and problems relating to the utilisation of the mineral or metallurgical resources of the Empire. Without endorsing their suggestion for the formation of a single Imperial Department of Minerals and Metals—a proposal which appears to us to offer constitutional and administrative difficulties at present—we are in sympathy with the general tenour of the proposals and consider it urgent that systematic work in the direction indicated should be undertaken by the proposed Imperial Development Board, working in conjunction and co-operation with the existing scientific and research departments and institutions of the various Governments of the Empire.

355. In particular it appears to us of most pressing importance to ascertain whether workable deposits exist of such minerals as quicksilver, platinum, borax, and potash, which are at present obtained almost solely from foreign sources. Also, where quantities of such minerals, *e.g.*, platinum, are known to occur in conjunction with other ores, it is imperative that steps should be taken to secure their recovery.* Further, investigation is needed, both in the case of minerals of which Empire supplies are at present unknown and in the case of minerals already worked, in order to determine the most economic means of production. It is unnecessary for us to emphasize the waste of resources which has occurred, and is still occurring, in

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* NOTE.—It has been stated that if the smelters of nickel, copper, and other ores could be induced, or required by legislation, to recover the platinum, palladium, &c., contained in them, the British Empire could probably produce its own supply of these metals.

many countries through uneconomical methods of extraction. To take only one example—it has been estimated that at the Rio Tinto Mines in Spain in the period of some 30 years about 7,000,000 tons of sulphur valued at not less than 14,000,000*l*. sterling were wasted through unskilful treatment of the ore, while, through modern improvements in the method of handling ore, about 1,000,000 tons of sulphur are annually saved to the world which would otherwise have been burnt and served only to pollute the atmosphere.*

356. We recognise, of course, the work which has been done by various mining companies and unofficial institutions in the matter of investigating the best means of extracting ores, but we regard the whole subject as one which affects not only the capitalist and the shareholder but the Empire as a whole. We, therefore, think that investigations and experiments might be carried out under the direction of a central Board working in the manner outlined above, which would also collate and disseminate the reports of private investigations.

357. We do not ignore the equally important problem of avoiding waste in the consumption of the mineral and other natural wealth of the Empire. But this involves so many important questions of very wide bearing that we do not propose to do more than to refer to it.

Petroleum.

358. The question of the petroleum supplies of the Empire is so important as to deserve special mention.

The known supplies within the Empire compare unfavourably with those at the disposal of several foreign Powers, and it is well known that, even before the War, successful efforts were made in Trinidad, New Zealand, and elsewhere to secure for Government purposes an option over the supplies produced from British sources.

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* Commission of Conservation, Canada, 6th Annual Report, 1915, p. 55.

359. We would suggest, in view of the importance of petroleum as an asset to the Imperial and Dominion Navies, that where in any part of the Empire an extensive oil-bearing area is found, steps might be taken to reserve some portions from public competition, so that, where circumstances permit, special provisions may be made for their development and the employment of the product for naval purposes. This course, we understand, has been already adopted by the Governments of the United States and Russia, and the example would seem well worth copying in the British Empire.

It would also seem desirable to make the principle of local refining of general application in the Empire, and, if possible, to insist on the erection of plant capable of refining to a specification approved by the Admiralty or Dominion naval authority.

FOREST PRODUCE.

360. In Chapter IV. of this Report we have called attention to the immense size and value of the forest resources of the Dominions, but at the present time the actual production of timber within the Empire is insufficient for its consumption. The United Kingdom is largely dependent upon Scandinavia for supplies, not only of timber, but also of wood-pulp and pit-props. It appears to us of importance that some investigation should immediately be undertaken in order to ascertain what cut of timber can actually be made within the Empire without drawing on capital supplies, and that thorough and co-ordinated systems of timber conservation and forestry management

should be agreed on between the technical officers of the Departments of Your Majesty's Governments. At the present time Canada is estimated to have between two and three hundred million acres of commercial timber, but the output of lumber is only approximately that of Germany where timber is cut on an area of 25 million acres only. The German output comes from lands which have taken at least a hundred years to bring to their present perfection as timber producers.* It is clear that investigation is needed into the best methods of conservation within the Empire and that careful observation should be maintained of the ratio between production and consumption. We recognise the value of the work which has been done in this direction in Canada, and consider that similar work should be carried out for the Empire as a whole.

AGRICULTURAL AND SIMILAR PRODUCE.

361. In our third class we include articles of which the supplies can rapidly be increased by extending the area or intensity of production. In the main this class will be found to coincide with that of agricultural produce generally. The investigation in regard to this category of materials will naturally be directed towards ascertaining what part or parts of the Empire have the soil, climate, and other conditions most suited for their production. This work is eminently one for joint action; however, as an illustration of what might be done, we propose to consider the case of two commodities which we regard as of outstanding importance, namely, cotton and maize.

362. *Cotton.*—The dependence of the Empire, and indeed of the world, on the United States of America for the bulk of its supplies of raw cotton is too well

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* *See* p. 207 of [Cd. 8459].

known to need detailed comment. The United States provide, approximately, 70 per cent. of the cotton crop of the world, and the dependence of the United Kingdom upon the supplies from this source is enhanced by the fact that the major portion of British spinning machinery is specially adapted to the spinning of cotton of the American type. Moreover there is already, generally speaking, a deficiency in the world's annual cotton crop, as compared with the world's demand, and it may be that, unless special steps are taken, this deficiency will tend to increase in the near future.

The need for increasing the supplies of cotton within the Empire is therefore urgent.

363. No doubt the more tropical parts of the Empire, such as India, Egypt, East and West Africa and the West Indies, afford at first sight the most promising fields for development of the cotton industry, but, as we have had occasion to show in our Second and Third Interim Reports,* there is a far greater opportunity in Australia and the Union of South Africa than is generally known.

It is clearly desirable that immediately circumstances permit each of these Dominions should proceed further with the local investigations already promised or undertaken, and in particular we urge—

(*a*) that expert advice should be sought by the Commonwealth and Queensland Governments as suggested in paragraphs 113 and 114 of our Second Interim Report;†

(*b*) that further inquiries should be made, if possible by the Commonwealth and Union Governments conjointly, into the possibilities of a mechanical picker;

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* [Cd. 7210] and [Cd. 7505].

† [Cd. 7210], pp. 48 and 49.

(c) that the British Cotton Growing Association should continue to afford to both Governments the measures of co-operation already agreed.*

364. *Maize.*—As in the case of cotton, the Empire is practically dependent on outside sources (mainly the Argentine) for its supplies of maize.† Quite apart from its present importance for human food, for feeding to cattle, pigs and poultry, and for the production of starch, maize is of great potential value as a cheap and easy source of industrial alcohol. The Union of South Africa and Rhodesia together form a most promising field for development,‡ and apart from the measures taken to stimulate the growth of maize for food and for agricultural purposes, we suggest that the Government of the Union would do well to obtain expert advice as to the possibility of using its maize locally for the production of industrial alcohol, and if possible to undertake the construction of an experimental factory.

Special Action in Particular Cases.

365. It is quite conceivable that investigation and research in the direction indicated as regards each of the three classes mentioned in paragraph 353 may show that there are no adequate means of obtaining sufficient supplies of some commodities within the Empire. In such an event, further investigation or research would be necessary to determine possible substitutes. As an illustration of what should be done in this direction we may mention the case of nitrates and potash.

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* [Cd 7210], p. 49, and [Cd. 7505] p. 37.

† [Cd. 8122], p. 23.

‡ [Cd. 7505], pp. 33 and 34.

NITRATES.

366. The dependence of agriculture on nitrogenous manures and the importance of nitric acid for war purposes bring into relief the necessity for the control of adequate supplies of the raw materials on which these substances depend. In the past the huge Chilian deposits of nitrate of soda were almost the sole source of supply, but more recently this mineral has been replaced by synthetic nitrates, which have been produced on a large scale in Norway and elsewhere by fixing the nitrogen from the air. This industry has also largely developed in Germany since the outbreak of war.

367. We regard it as of the greatest importance to stimulate within the Empire the production of adequate and suitable agricultural fertilisers, especially in view of the future needs of the vast grain-producing areas of Canada. Various technical questions arise in this connection, and these, we think, should be investigated with the necessary expert assistance, by the proposed new Imperial Board. We emphasise the fact that the water power of Canada and New Zealand should place these Dominions in a very favourable position for the production of synthetic nitrogen compounds. In this connection we would also refer to the need for investigating the possibilities of utilising the immense deposits of peat which exist in Ireland, Canada and other parts of the Empire as a source of fuel and agricultural fertilisers.

POTASH.

368. The Empire, and indeed the whole world, has been dependent in the past on large mineral deposits in Germany for their supplies of potash, which is essential both as a fertiliser and in the production of numerous fine chemicals. Investigations, so far, do not point to the probability of the existence of any

large workable deposits within the Empire, and the question of other means of obtaining potash appears to offer a more promising field for investigation than the search for natural supplies. Already the manufacture of potash from feldspar by a hydro-electrical process in Canada is contemplated.* Attention is also being devoted in Canada and other parts of the Empire to the possibility of obtaining potash from vegetable sources, *e.g.*, kelp. Our attention was called by witnesses in Victoria and Vancouver to the existence on the coast of British Columbia of large available supplies of suitable seaweed.† Sir William MacGregor, in an address before the Royal Society of Arts, mentioned the existence of huge accumulations of kelp off the coast of Labrador.‡ Kelp burning is also practised on the west coast of Ireland, where there are considerable deposits. There is no doubt that similar accumulations exist in other parts of the Empire, but investigation is needed as to the possibility of utilising them as a source of potash.

Investments of Capital in Developing Raw Material Resources.

369. It is unnecessary to emphasise the influence which wise direction of the investment of British capital could exercise on the development of the natural resources of Your Majesty's Dominions. Here we need only deal with the question of similar investments in foreign countries. Special cases may arise in which raw materials of great economic and military importance, *e.g.*, quicksilver and platinum, cannot be found in sufficient payable quantities within the Empire. In this event we regard it of importance that British capital should be directed towards the multiplication of sources of supply.

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* "Canada, 20th Century," p. 210.

† *See* p. 338 of [Cd. 8459].

‡ "Journal of the Royal Society of Arts," April 28th, 1916.

If supplies cannot be obtained from British sources it is clear that in the general interests of the Empire its civil and military industries should draw their supplies from as many sources as possible, and not depend on a single foreign country for their requirements.

Direct Government Stimulus to Production.

370. The lines of action which we have hitherto suggested in order to stimulate within the Empire the production of commodities for which it is at present dependent on foreign sources have mainly been those of scientific investigation and research co-ordinated under and arranged by an Imperial Development Board. We are conscious, however, that it may be many years before such investigation yields its full result, and we propose to refer here to certain more immediate and direct lines of action which it may be desirable to follow in the meantime. Many of these, it will be seen, are already adopted by various States. Measures of this kind fall under the following principal heads:—

(a) BOUNTIES ON OUTPUT.

The Government of the Commonwealth of Australia has for several years granted bounties in order to encourage the manufacture and production of various articles in the Commonwealth. These, in the main, are agricultural products. For some time past a bounty has been given on the output of cane and beet sugar in Australia, whilst cotton, flax, and hemp, as well as dried fruits, have also received a bonus. Canada has for some years been paying a bounty on lead and crude petroleum and, as we have already mentioned, has now provided a bounty on the output of zinc, whilst the Ontario Government has for some time paid a bounty on cobalt oxide.

(b) GOVERNMENT PURCHASE AT A MINIMUM PRICE.

This means of stimulating production can, in our opinion, be properly applied only to articles of which increased production is vitally necessary to the Governments of the Empire, either individually or as a whole, or of which it is essential, in the national interests, to control the whole output.

(c) RESTRICTION OF FOREIGN CONTROL.

We may mention here the "British Character" Clauses contained in such legislation as the Canadian Crown Lands Regulations* for the disposal of petroleum rights in Manitoba, Saskatchewan, Alberta, and other Dominion lands. These Regulations contain the following provisions:—

(*a*) Any company acquiring a lease shall at all times be and remain a British company, the majority of the directors shall be British subjects, and the company shall not be directly or indirectly controlled by foreigners or a foreign corporation.

(*b*) The Dominion Government may at any time take over, subject to compensation, the whole of the locations acquired under the Regulations, with all the works, machinery, and plant.

The New Zealand Mining Amendment Act of 1914 contains similar provision as to the taking over of oil-bearing property and works in time of war.

These clauses might be applied more widely and by other Governments of the Empire, not only to petroleum but also to other minerals if there is reason to apprehend that effective control might pass into foreign hands. In particular we should be glad to see them applied to the oil-bearing shales of New Brunswick and to Government leases of Crown lands to any company intending to produce wood pulp or paper.

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* **Canadian Order in Council of January 19th, 1914.**

(d) RESTRICTION OF GOVERNMENT PURCHASES TO ARTICLES PRODUCED FROM EMPIRE MATERIALS.

It is not perhaps generally realised to what extent, even in times of peace, Government departments are purchasers of various classes of goods; thus, the Union of South Africa imports normally about 3,000,000*l*. worth of railway materials and other merchandise on Government account, whilst similar imports into India are even larger. In calling for tenders for the supply of merchandise and the execution of contracts, many Government departments already accord preferential terms to British articles, and we consider that as a means of stimulating the output of essential materials within the Empire, this practice might be extended, especially in regard to such articles as might be scheduled by the suggested Imperial Board as requiring special treatment.

371. In our view it should be left to the various Governments of the Empire to continue or extend such measures as we have described under these four heads until the details of the numerous problems involved have been carefully worked out, with competent scientific advice, by the suggested Imperial Development Board.

The advice of such a Board will enable the different Governments to take such measures as are necessary with a wider outlook and fuller appreciation of the requirements of the Empire as a whole.

SUMMARY.

372. The main conclusions and recommendations in this Chapter of our Report may be summed up as follows:—

(*a*) We regard it as vital that the Empire's supplies of raw material and commodities essential to its safety and well-being should be, as far as possible, independent of outside control. As the first step towards ascertaining how such independence can be secured, we recommend that an immediate survey should be undertaken of the relation between Empire production and Empire requirements of these materials and commodities, such survey to be made by an Imperial Development Board. This body should further be entrusted with the duty of watching and reporting on the changing requirements of the Empire in respect of raw materials.

(*b*) Working on the results of the survey when completed, the Imperial Development Board should next address itself to the question whether the Empire can produce those raw materials and commodities which now are, or may in the future be found to be, produced and controlled outside its limits.

(*c*) The Board should have funds sufficient either itself to investigate, or to promote the investigation of:—

1. Measures to prevent waste in existing sources of supply.

2. The possibilities of new sources of supply.

3. The possibilities of substitutes where supplies of any commodity of importance are found not to be available within the Empire.

(*d*) Your Majesty's Government and the Oversea Governments should in the meantime take steps to stimulate output and control supplies on the lines indicated in paragraph 370 above.

373. We suggest other functions for the proposed Imperial Board elsewhere in this Report and particularly in Chapter XIV. below.

CHAPTER VII.—SCIENTIFIC RESEARCH IN RELATION TO THE DEVELOPMENT OF NATURAL RESOURCES.

374. The intimate connection of scientific research with the proposals outlined in the foregoing Chapter for the development of Natural Resources is obvious. We propose, therefore, next to consider the institutions which exist in the Mother Country and the Dominions for the organisation of such research in its application to the commercial development of the resources of the Empire.

It must be confessed that this question had received but scant general attention during the years immediately preceding the War, but since the outbreak of hostilities, on account of the many deficiencies which came to light, more serious consideration has been given to it.

375. For example, a special Committee of the Privy Council was formed in 1915 for the organisation and development of scientific and industrial research, with

reference to the United Kingdom.* The scope of this Committee has been recently enlarged, and under it has now been formed a new department of Your Majesty's Government. It has been also suggested that the scheme outlined by the Committee should be extended to cover the whole Empire, and, as a result, several of the Dominions have taken steps to organise similar Committees whose object will be to stimulate scientific investigation locally, and correlate it with similar work in the Mother Country. In Canada and Australia such organisations have been completed and are now actively at work.

376. Again, by Order in Council of the 7th July, 1916, provision was made for the addition of representatives of the self-governing Dominions, India, and the Crown Colonies, to the governing body of the Imperial College of Science and Technology in London.

377. We welcome both of these schemes, though, owing to their brief existence, it would be premature to comment on them in detail. They show a quickening of the spirit of the Empire towards scientific investigation, and we are confident that, granted adequate co-ordination, good will result.

378. We think, however, that it is of great importance to enquire in detail into the functions and workings of the one body which during the pre-War period was engaged in scientific research in relation to the Empire's resources—we refer to the Imperial Institute in London.

It is clear that this body, if it is to fill the purpose of its designers, ought to occupy an important place in Imperial organisation. A close examination is, therefore, needed of its constitution and of its effectiveness for the purposes which it was set up to fulfil.

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* [Cd. 8005]. *See also* the Report of this Committee for 1915-16 [Cd. 8336].

IMPERIAL INSTITUTE.

History.

379. The Imperial Institute was erected as an Imperial Memorial of the Jubilee of Her Majesty Queen Victoria. The site on which it stands in South Kensington was granted, at a nominal rent, by the Commissioners of the International Exhibition of 1851, and practically all parts of the Empire, either by official or by private donations, contributed to the funds for its building and equipment.* It was constituted by Royal Charter dated 12th May, 1888. Its main objects, as declared in its Charter, were as follows:—

1. The formation and exhibition of collections representing the important raw materials and manufactured products of the Empire and of other countries so maintained as to illustrate the development of agricultural, commercial, and industrial progress in the Empire and the comparative advances made in other countries.
2. The establishment or promotion of commercial museums, sample rooms, and intelligence offices in London and other parts of the Empire.

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* The detailed contributions amounted in all to just over £429,000. Those from the United Kingdom, India, and the self-governing parts of the Empire were as follows:—

——	Official	Private.	Total.
	£	£	£
United Kingdom	—	250,445	250,445
India	—	114,528	114,528
Dominion of Canada... ...	20,000	87	20,087
Australian States	18,711	5,833	24,544
New Zealand	—	2,853	2,853
Cape Colony and Natal ...	—	647	647

3. The collection and dissemination of such information relating to trade and industries, to emigration, and to the other purposes of the Charter as may be of use to the subjects of the Empire.
4. The advancement of trades and handicrafts by exhibitions of special branches of industry and commerce and of the work of artisans and of apprentices.
5. The promotion of technical and commercial education and of the industrial arts and sciences.
6. The furtherance of systematic colonisation.
7. The promotion of conferences and lectures in connection with the general work of the Institute and the facilitating of commercial and friendly intercourse among the inhabitants of the different parts of the British Empire.

380. We need not enter in detail into the various phases of the early history of the Institute, which will be found recorded in the evidence.* It will suffice to say that as originally constituted it was mismanaged, that part of its work was left undone, and part done imperfectly, and that new organisation became imperative.

381. In 1899 the buildings were taken over by Your Majesty's Government on account of the financial exigencies described below. A long lease of a part was given to the Institute, and a considerable portion assigned to the University of London—an allocation which, we may remark incidentally, has been a source of much heart-burning both to the Institute and to the University.

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* Dunstan, p. 70 of [Cd. 7710].

382. In 1902 an Act of Parliament* was passed transferring the management of the Institute to the Board of Trade. The Board was required to carry out the purposes of the Imperial Institute as defined in its Charter, as far as practicable, and such other similar purposes as the Board should determine, having regard to the commercial, industrial, and educational interests of the Empire. The Act further provided that the Board of Trade should be assisted by an Advisory Committee, including representatives of various Departments of Your Majesty's Government and of the Dominions, Colonies, and India. Provision was made in the Act for varying the constitution of the Committee, with a view to securing the proper representation of the commercial and industrial interests of the Empire.

383. In 1907, owing to the increasing contributions made by the Crown Colonies towards the work of the Imperial Institute, a working arrangement was made whereby its control was transferred to the Secretary of State for the Colonies, subject to the responsibility of the Board of Trade under the Act of 1902.

384. By the Imperial Institute (Management) Act, 1916,† the arrangement whereby the Secretary of State for the Colonies was responsible for the work of the Institute, was regularised. This Act resulted in the abolition of the Advisory Committee set up by the Act of 1902 (and also of the Managing Committee of three members which had for some years superintended the work of the Institute), and substituted an Executive Council of 25 members with a term of office of three years. Of these, 14 were to be appointed by the Secretary of State for the Colonies, five by other departments of Your Majesty's Government, one by each of the Governments of the self-governing Dominions, and one by the Government of India.

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* 2 Edw. VII. c. 139.

† 6 Geo. V. c. 8

385. The present Director (who is also a member of the new Executive Council), is Professor Wyndham R. Dunstan, C.M.G., F.R.S., who has held the post since 1903.

Finance.

386. It may be convenient, before proceeding further, to deal briefly with the finances of the Imperial Institute.

(*a*) Capital Funds.

387. As we have already shown, the original funds available for the establishment of the Institute amounted to 429,000*l.*; from this has to be deducted a sum of 140,000*l.* with which was created an "Endowment Fund" in conformity with the provisions of the original grant of the site upon which the Imperial Institute was erected.* Though the details are somewhat obscure, the remainder of the original sum, viz., 289,000*l.*, together with a further sum of some 55,000*l.* raised by a mortgage and from other sources, appears to have been expended on the building and preliminary expenses.

388. Owing to financial difficulties in connection with the repayment of the 55,000*l.* already referred to, the building was taken over in 1899 by Your Majesty's Government. The consideration given was—

(*a*) liquidation of the Institute's liability for the debt of 55,000*l.*;

(*b*) a lease of a part of the building to the Institute for a term of 987 years without rent;

(*c*) acceptance of liability for rates, &c., and external repairs. The amount spent on these services amounted in 1916 to some 4,600*l.* in respect of the whole building.

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* This was subsequently reduced by £26,000 which was withdrawn as a contribution to the cost of the North Gallery.

389. The Endowment Fund of 140,000*l.*, has been disposed of as follows:—

114,000*l.* has been invested in British and Indian Government stocks, estimated to produce 3,426*l.* in 1916-7.

As regards the 26,000*l.* contributed, as we have shown, to the cost of the North Gallery, the Institute receives an annuity from the Commissioners of Works of 864*l.* per annum, expiring in 1941. Against this annuity a Sinking Fund has been created standing on 31st March, 1916, at over 7,000*l.*, invested in Indian stock.

390. There is also a Pension Reserve Fund standing at nearly 7,000*l.* on March 31st, 1916.

(*b*) INCOME AND EXPENDITURE.

391. In addition to the receipts from the Endowment Fund and from the annuity, to which reference has just been made, the main income of the Imperial Institute according to the Estimates of 1916-7 was derived from contributions from the following Governments:—

	£	*s.*	*d.*
Imperial Government* ...	2,500	0	0
Dominion Governments† ...	1,667	2	0
Government of India	1,400	0	0
Governments of Colonies and Protectorates	5,224	0	10

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* This includes the sum of £1,000 for the recently started Technical Information Bureau.

† This amount is made up as follows:—

	£	*s.*	*d.*
Canada	450	0	0
Newfoundland	200	0	0
Commonwealth of Australia	500	0	0
Victoria	100	0	0
Western Australia	77	10	0
New Zealand	89	12	0
Union of South Africa	250	0	0
	1,667	2	0

Miscellaneous receipts brought the total estimated income for 1916-7 to 18,626*l*.

It should be added that some of the Dominions have spent large sums on the equipment of their collections, whilst the whole contribution of certain others is for floor space only.

The expenditure for 1916-17 was estimated at 18,623*l*.

Present Functions of the Institute.

392. We proceed to consider broadly the work done by the Institute, and the question whether it occupies the position which its designers had in view. The objects of the Institute as defined in the Charter have been already set out. We give below its principal work at present as described in the statement prepared for us by the Director of the Institute* :—

1. To illustrate, by means of collections in the public galleries, the present condition, industries, and natural resources (mineral, animal, and vegetable) of the various parts of the Empire.
2. To provide for the scientific and technical investigation of raw materials, more particularly those produced within the Empire, with a view to their commercial utilisation, and to supply information respecting the production, commercial employment, and value of such materials.
3. To issue reports and publications on these subjects, including the "Bulletin of the Imperial Institute," which is published quarterly, and is a record of the results of the more important investigations conducted at the Imperial Institute, and also

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*P. 171 ff. of [Cd. 7351].

a general record of progress in tropical agriculture and the commercial utilisation of raw materials of all kinds.

393. The programme laid down by the Charter was drawn up, no doubt intentionally, in such terms as to allow a good deal of latitude to those engaged in the practical administration of the Institute's work. Comparison of the objects specified in the Charter with the work done shows, however, considerable discrepancies between intention and attainment. Certain of the original functions are partially carried out; for example, the promoting of conferences and lectures, though, so far as we are aware, these relate almost exclusively to matters affecting the Colonies not possessing responsible Government and the Protectorates. As regards others—for example, the collection and dissemination of commercial information—action is no longer necessary, the functions of the Institute in this respect having been taken over by the Commercial Intelligence Department of the Board of Trade.* The furtherance of systematic colonization has been, and remains, for practical purposes, a dead letter.

Criticisms.

394. The Imperial Institute is criticised from two points of view. It is argued on the one hand, that no adequate return is given by it for the very large sums involved in its building and equipment. It is urged, on the other hand, that want of adequate funds is mainly responsible for the present limitations of the Institute's work. At any rate, all agree that considerable deficiencies exist.

395. *Exhibits.*—We should expect to find a notable collection of exhibits from all parts of the Empire. As it is, the Canadian exhibit is remarkably complete.

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* Dunstan, Q. 1023, p. 79 of [Cd. 7710].

that of the Union of South Africa has recently been reorganised and it is hoped that the Australian Exhibit will be remodelled and modernised in the near future.[*] Of the remainder we can only say that in some cases they are considerably out of date, and generally that they are somewhat unworthy of the parts of the Empire which they illustrate.

There appear to be no definite arrangements with the various parts of the Empire for the provision of exhibits of materials which have recently assumed economic importance, for the periodical replacement of obsolete exhibits, and for the provision of better show cases.[†]

396. Moreover the collections at present can only be seen by residents in, or visitors to, London. Better arrangements are needed for obtaining duplicates which could be sent for exhibition at different local centres for short periods, and thus be of use to prospective emigrants.

397. *Library.*—An important adjunct to the exhibits is the Library and Reading Rooms which contain publications, British and foreign, having a bearing on the conditions, natural resources, or economic development of the British Dominions, Colonies, and India, and the Colonies of foreign Powers.[‡]

This Library is in constant use by the staff of the Institute, but is little used by others interested, to whom it might be made more available.

398. *Investigation of Raw Materials.*—This work is partly of a purely scientific character and partly deals with the industrial utilisation of new products. In both these branches of its work the Institute undoubtedly does good service to India, the Crown Colonies, and the Protectorates, and it is gradually assuming with respect to them the position of a

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[*] *See* p. 28 of [Cd. 8172-8].

[†] *See* p. 173 of [Cd. 7351].

[‡] p. 173 of [Cd. 7351].

technical laboratory. In fact nine-tenths of the inquiries undertaken relate to the Crown Colonies and India.*

399. The services which the Institute can, and does, render to the Dominions are of much less value. The technical departments of the Dominions are better equipped than those of the Crown Colonies and Protectorates for investigation and research. They have officers for assaying minerals, analysing substances. and testing materials, and their equipment in this respect is being constantly strengthened.

400. By means of their commercial representatives in London the Dominions are now able more readily to ascertain the commercial and industrial possibilities of their products, and they have practically become independent of the help of the Institute in this respect. They are also able to an increasing extent to induce manufacturers in the United Kingdom to undertake the experimental utilisation of new materials—work which can be more usefully carried out in practical working conditions than in the more severely scientific atmosphere of the laboratory of a public institution.

401. With the improvement of their scientific and commercial organisations the Dominions have become less and less disposed to rely on the work of the Institute.† We found in the Dominions that the Imperial Institute was seldom more than a name. It finds no place in their current activities or in their theories of Imperial organisation.

402. *Bulletin of the Institute.*—The quarterly Bulletin, which is the general record of the investigations and progress of the Institute, had in 1914 a

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* Henry, Q. 2675, p. 177 of [Cd. 7351].

† We notice that the annual contribution of the Union of South Africa has recently been reduced from £800 to £250, and that New Zealand contributes only £89 a year. This latter payment is made for floor space only.

circulation of some 1,800 copies only—obviously a quite inadequate number for a journal which, if it is to serve its purpose, should be widely read in the Dominions and Colonies as well as in the United Kingdom. We understand that at the present time only 2,000 copies are printed off each quarter.

403. *Administration.*—The present Director of the Imperial Institute is not only a member of the Executive Council, but also its chief scientific expert and its head administrative officer.

Our investigations in the Dominions lead us to think that the latter arrangement has been one of the difficulties in the way of co-operation.

Our opinion is—

(*a*) that the officers of the Institute should not be members of its Governing Body,

(*b*) that administrative functions should not be combined with the duties of research.

404. Further, whilst we recognise the standing and scientific attainments of the principal assistants to the Director, we observe that each of them is in receipt of a salary of less than 500*l.* per annum, whilst no sufficient provision can be made for pensions from existing resources. It is obvious that remuneration on this scale is inadequate to attract permanently the best men, and it is not surprising that there is frequent wastage through members of the scientific staff leaving to take up more remunerative employment. This is the more to be regretted since it would appear that the new Executive Council only includes one scientist of recognised standing in addition to the Director, and that no members were appointed in consequence of their experience in technical investigation. It seems clear that, regarded from the point of view of scientific and technical research, the work of the Institute must fall with undue weight on the shoulders of the present Director.

PROPOSALS FOR REFORM OF IMPERIAL INSTITUTE AND DEVELOPMENT OF RESEARCH WORK WITHIN THE EMPIRE.

405. The two chief branches of the work done by the Institute, that is to say the maintenance of exhibits of the resources of the Empire, and the investigation of its raw materials with a view to their commercial utilisation, are of recognised importance, and there will be no divergence of view as to the necessity for their continuance in some form or another.

The points on which we wish to concentrate attention are these:—

First, how can it be arranged that the exhibits shall really constitute an up-to-date record of the resources of the Empire;

Secondly, is it possible to secure that the Institute shall do effective work for the self-governing Dominions, having regard to their existing equipment for scientific research, and the prospect that this equipment will be progressively improved.

MAINTENANCE OF EXHIBITS.

406. The object aimed at in the Exhibition Galleries of the Institute is to provide a centre in London where a complete and up-to-date display of the resources of all parts of the Empire is given. No impartial critic can maintain that the display in the galleries of the Imperial Institute at South Kensington is adequate for this object. The tendency has been for the galleries to become a repository of the past, rather than a living exhibition of the present. The revivification which is needed can, in our opinion, be secured only by handing over the management of the exhibits to some organisation which will not confine its energies to receiving specimens supplied at intervals by

Government departments, but will be in daily touch with visitors from overseas who will keep it in contact with the latest developments in each part of the Empire. An unofficial body is much more likely to take care of exhibits and maintain them at a high level than even the best of official bodies.

407. In these circumstances we recommend that an endeavour should be made to arrange that the responsibility for the exhibits now under the care and control of the Imperial Institute should be handed over to the Royal Colonial Institute, whose splendid enthusiasm and close connection with all parts of the Empire overseas make it eminently fitted for work of this character. The Charter of the Royal Colonial Institute provides for the maintenance of a museum, but it has so far been found impossible to give effect to this provision.

SCIENTIFIC INVESTIGATION.

408. On the second question, viz., that of scientific investigation and research in connection with the self-governing Dominions, we desire especially to consider the position of the Imperial Institute in relation to the proposals outlined in the preceding Chapter of this Report for the more scientific development of the natural resources of the Empire.

It would be natural to suppose that the Institute should play a leading part, either in arranging, or in co-operating in, the necessary research work, and in fact it was stated publicly in the Imperial Parliament that the reorganisation of the governing body of the Institute effected in 1916 was in order to put the Imperial Institute in a strong position to take a leading part in the industrial and commercial reorganisation which would follow after the War.

409. We are loth to prejudge the results of the reorganisation of the Institute effected by the Act of

1916, more particularly as the work of the newly appointed Executive Council has necessarily been somewhat handicapped by war conditions. We also recognise that, in theory, there may be cases where the wide and general experience of the technical officers of the Institute should be of service to the self-governing Dominions. It is clear, however, from our investigations that, for the most part, the Dominions do not take this view, and it would be idle to suggest that they would view with favour the utilisation of the Institute by any new Imperial organisation for research work in relation to the development of their own resources and products.

410. At the present time the various self-governing Dominions are making strenuous endeavours to strengthen their own scientific and technical departments and to encourage local investigation, and we are convinced that any proposal again to concentrate this work in the Imperial Institute in London would be regarded as reactionary. It is recognised that in the past the Institute has done valuable work, and this tradition has doubtless influenced the Governments of the Dominions to continue, though in diminishing proportions, their contributions to the Institute. The time has now arrived, however, when these funds could better be devoted to strengthening their own scientific departments.

411. In our view, the best organisation for the future would be that the self-governing Dominions should concentrate their efforts on the development of their own research institutions, whilst the Imperial Institute would become altogether (as it is already, to the extent of nine-tenths of its work) a research centre for India, the Crown Colonies and Protectorates.

412. The Imperial Development Board which we propose should refer to it for help in connection with its enquiries relating to those parts of the Empire, but

it would go elsewhere for investigations relating to the Dominions and the United Kingdom. Thus it would turn to the scientific and research departments of the Dominions for investigation into Dominion products, and it would go, in the case of the United Kingdom, to the newly formed Department for Scientific and Industrial Research, to institutions such as the National Physical Laboratory at Teddington, or to private advisers of note.

In other words, the Imperial Development Board would utilise the Imperial Institute as one of many institutions for research.

Arrangements Contingent on Reform.

413. It remains for us to consider certain further matters arising if the above recommendations are accepted.

414. First, it is unlikely that room could be found in a more central site in London for the exhibits now maintained at the Imperial Institute. In our opinion it is, in any case, undesirable that the stately buildings erected in memory of Queen Victoria should be dissociated from the exhibition of the natural resources of the oversea portions of Your Majesty's Empire.

415. Secondly, though there are advantages in having scientific research conducted in buildings in proximity to the display of raw materials, the originals of which are available for comparison, and the duplicates for use, we do not think that such proximity is essential. In our judgment it would be better to remove the scientific work now carried on by the Imperial Institute to another building. This procedure would give additional space in the present building for the development of the exhibits. The space available for scientific work at the Imperial Institute is said to be already unduly cramped.

416. Thirdly, the proposed changes would necessarily involve certain financial adjustments. These could best be settled by a small committee consisting of representatives of the Royal Colonial Institute and the Imperial Institute. It would clearly be essential that the Royal Colonial Institute should not lose financially by undertaking new and responsible work, and, therefore, that some part of the Endowment Fund of the Imperial Institute should be handed over to it. In any event we do not anticipate that Your Majesty's Government would object to a continuance of the present arrangements, whereby no rent is charged for the building and responsibility accepted for rates and external repairs. We are also confident that all the other Governments of the Empire would welcome the transfer to a responsible body working under a Royal Charter, such as the Royal Colonial Institute, of the care and maintenance of the exhibits.

417. Lastly, there would remain the question of nomenclature. We do not wish to make a definite recommendation on this point, but we suggest that there might be advantage in the present Imperial Institute taking some other name, and in its title being handed over to the Royal Colonial Institute, if this course were desired. This would secure that the origin and primary functions of the Imperial Institute should not fall into disremembrance.

CONCLUSION.

418. It is impossible to overrate the importance of securing to all parts of Your Majesty's Empire adequate facilities for scientific research in connection with the development of their natural resources. In our judgment, there are few objects to which public money can be more usefully devoted than to strengthening the material equipment of the Empire in this respect, and to training suitable personnel.

419. As regards the Imperial Institute, however, we have felt bound to make the above recommendations in the interests of efficiency and because, in the best interests of the Empire, we are convinced that matters cannot be allowed to rest as at present. We see no prospect that, under the present system, the exhibits are likely to be maintained at a satisfactory level, or that the relations between the administration of the Imperial Institute and the self-governing Dominions can ever be placed on a satisfactory footing.

Accordingly, in our opinion, the Institute should, in future, limit its activities to those definite functions which experience has shown it is able to perform with success.

CHAPTER VIII.—MIGRATION.

420. Natural resources and their development are a fruitful theme for discussion. It is clear, however, that this development cannot be achieved without adequate man-power. Hence it comes that of all the problems which lie before Imperial statesmanship none is more important and none more fascinating than that of migration. Its successful organisation lies at the root of the problem of Empire development, and largely upon it depends the progress of the immense territories of the Dominions and the increase of power of the Empire as a whole. It is a problem which attracts no less the philanthropist than the statesman, for while to the latter the creation of strong and vigorous communities in distant lands appeals with the greatest force, to the former the possibility of endowing large numbers of the younger generation in the Mother Country with opportunities for happiness and prosperity greater than those which they

possess in the land of their birth, opens vistas for successful endeavour such as may be found in no other department of social amelioration.

421. It is a problem which requires, in our judgment, far more sustained attention than it has hitherto received. Of all the subjects which we have investigated we have found none in which scientific study and scientific treatment are more necessary to replace the spasmodic fluctuations of opinion which have governed the discussion of emigration problems in the past.

FIGURES OF MIGRATION IN RECENT YEARS.

Difficulties in collecting and interpreting statistics.

422. In view of the importance of the subject it is remarkable how little accurate information is available on the net outward movement of population from the United Kingdom in recent years and the net inward movement into the Dominions. It is essential to point out some of the difficulties which have to be faced in any statistical examination of the subject.

UNITED KINGDOM.

423. The difficulties of obtaining a precise measure of the outflow from the United Kingdom are considerable, and may be described as follows:—

(*a*) Until April, 1912, the returns of passenger movement at the ports of the British Isles did not distinguish permanent migrants from temporary arrivals and departures. The Board of Trade, however, in April, 1912, started to collect figures intended to distinguish passengers with future permanent residence within and outside the United Kingdom. These new returns are not regarded as trustworthy for various reasons,* and they do not, of course, afford any comparison with the course of migration in earlier years.

(*b*) The usual practice in dealing with migration questions has been to take the excess of passengers of British nationality from the United Kingdom to non-European countries over the arrivals of such passengers from non-European countries as representing the net emigration from the Mother Country. This course was followed by the President of the Local Government Board of the United Kingdom in discussing the question at the Imperial Conference of 1911.† The experience of the Board of Trade in the collection of the new returns tends, however, to show that this is an underestimate and that the excess of permanent emigration from the United Kingdom over permanent immigration may be greater than the excess of outward over inward passengers to non-European countries.‡

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* H. of C. 183 of 1913, page v, and H. of C. 295 of 1914, page x.

† [Cd. 5745], p. 199 *ff.*

‡ *Note.*—In 1913, the first calendar year for which figures are available, the excess of British emigration over immigration was 303,685, according to the new returns. But the outward passengers of British nationality to non-European countries, during the same period, only numbered 241,997 more than the inward British passengers. The latter figure represents the loss by migration computed on the previous basis. Some part of the large discrepancy (over 60,000) is thought, however, to be explained by the following considerations—

(*a*) Some of those spoken of in the new form of return as intending emigrants, though correctly classed as such at the time, did not, in fact, settle permanently overseas, but for some reason or other returned to the United Kingdom.

(*b*) Others classed as leaving a permanent residence in the United Kingdom (and therefore as emigrants) had, in fact, their permanent residence either in other parts of the British Empire or in foreign countries, and were merely returning to their homes. (*See* H of C. 295 of 1914, page x.)

(*c*) In any case there is a certain amount of unrecorded emigration from the United Kingdom. Emigrants to Canada, Australia, and New Zealand often work their passages out as temporary stewards or in other capacities, and are consequently not recorded as passengers. Desertion of sailors abroad similarly contributes towards swelling the numbers of those who elude the recording officials.*

424. Even if full and accurate figures were available, it is essential that they should be most carefully analysed in order to provide an accurate picture of the movement of population in each direction, and to afford a precise record of the drain of migration on the effective strength of the Mother Country. The reason is that the return inward flow is not only much smaller than the outward, but differs from it in the essential characteristics of age and wealth. Those who emigrate are young, and are in pursuit of fortune. Those who return are of mature years, and in many cases have achieved success and acquired wealth.

SELF-GOVERNING DOMINIONS.

425. Whilst in most of the Dominions accurate figures are collected as to the numbers of immigrants who receive Government assistance, or who in other ways come within the purview of the legislation and regulations affecting immigration, we doubt whether in general there is any careful measurement of the immigration of other persons into those Dominions, such as Canada and Australia, which possess carefully

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* Burns, p. 186 of [Cd. 6516].

compiled records of controlled or assisted immigrants. The records of the outflow of population from the Dominions are also, in our opinion, inadequate. It is unnecessary to labour the point. The disappointment which frequently results from the publication of the decennial Census returns of the Dominions is, we think, sufficient proof that the annual migration returns are inaccurate and have led to false hopes. We call attention, however, to one or two examples which were brought before us in evidence:—

426. *Canada.*—In Canada we found that the question of the volume of emigration across the United States frontier in the West was a matter of acute controversy. Assertions were reported to have been made that in one year departures of this kind reached a total of 133,000, and that for the first six months of 1916 the exodus was even larger.* The official records of migration from Canada go to show that these figures were grossly exaggerated, but owing to the method of collection it is unfortunately impossible to regard them as definite proof. Official statistics are only kept in Western Canada,† and even there a passenger leaving the Dominion is only asked first of all whether he is a Canadian citizen or not. If he replies in the negative, whether accurately or with a deliberate intention to deceive or, as often may be the case, in ignorance of the official definition of Canadian citizenship, he is not subjected to any further interrogation, but is regarded as a mere transmigrant *en route* for United States territory. Only if he claims Canadian citizenship are further particulars required from him, and is he treated as an emigrant in arriving at figures of net immigration.‡ It is curious to find

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* *See* Bruce Walker, Q. 698, p. 48 of [Cd. 8458].

† *i.e.*, from the Great Lakes to the mountains : *see* Bruce Walker, p. 48 of [Cd. 8458] and *cf.* Robertson, Q. 1262, p. 71 of [Cd. 8458].

‡ Bruce Walker, *loc. cit.*

on the other hand that the United States authorities, whilst carefully recording the migration of aliens, do not keep records of the migration of naturalised United States citizens across their frontier.*

427. *Australia.*—The Commonwealth Statistician informed us† that the misstatements of age by passengers arriving or departing were so great as to render migration statistics valueless on this point. The Government Statistician in Queensland also stated in evidence that figures as to persons arriving in the State were largely duplicated and that in one case a man was returned five times as an arrival from New South Wales on a single journey.‡

428. In *New Zealand* and the *Union of South Africa* only arrivals and departures of passengers are recorded, and no attempt is made to distinguish between permanent immigrants and emigrants on the one hand, and travellers on the other.

Recent Volume and Direction of Migration from the United Kingdom.

429. It is thus with some reservation that we examine the figures of migration from the United Kingdom as measured by the passenger movement to non-European countries. Broadly, however, the volume of migration is shown in the appended diagram, which indicates the total net outward movement in each year since 1890, distinguishing that to foreign countries from that to British Possessions, and also illustrates the net inward movement of aliens since 1907, when statistics were first collected.

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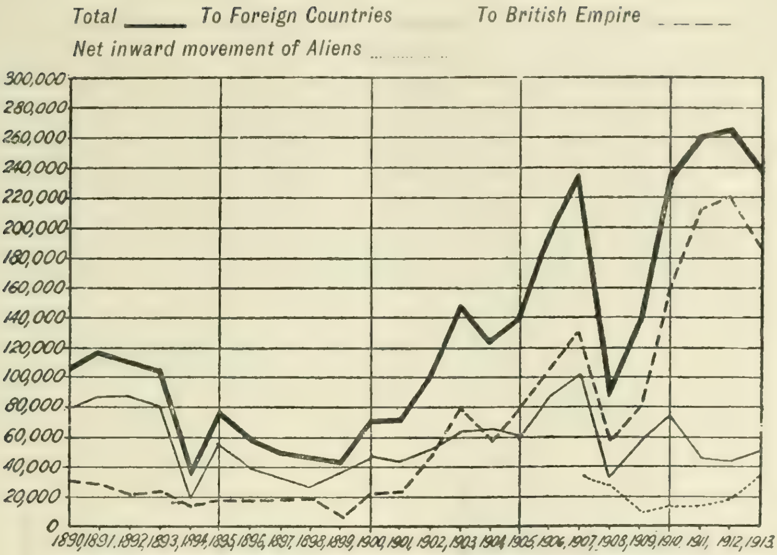
* United States Department of Labour. Annual Report of the Commissioner-General of Immigration, 1914–5. pp. 49–50.

† Knibbs, Q. 12,225, p. 241 of [Cd. 7172].

‡ Weedon, Q. 11,934, p. 220 of [Cd. 7172].



430. Three facts are at once apparent on examining this diagram:—

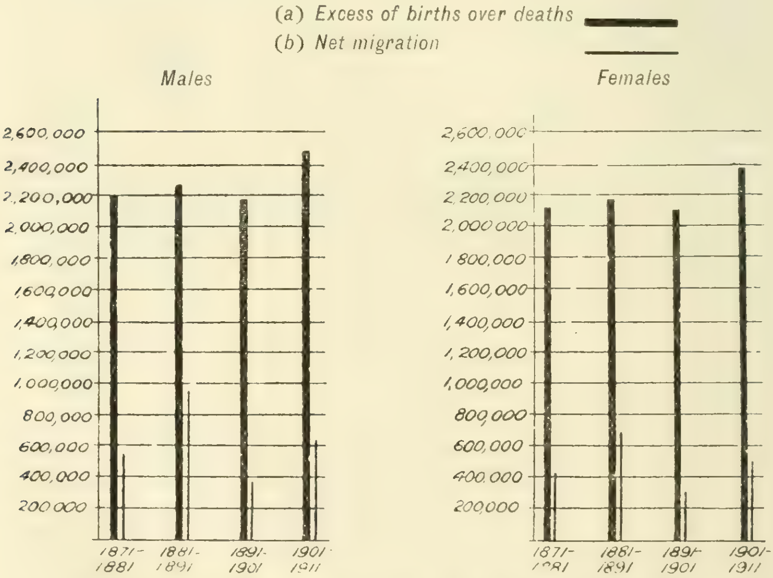
(*a*) that migration is subject to violent fluctuation, but that the tendency was on the whole upward during the last twenty years before 1914;

(*b*) that a marked change has occurred in the destination of migrants. Whereas in the period 1891–1900, only 28 per cent. went to the British Dominions and the remainder to foreign countries, principally the United States, in the period from 1901-12, 63 per cent. migrated to places within the Empire. In 1913 this proportion increased to 78 per cent.;

(*c*) that the net immigration of aliens (mainly from European countries) into the United Kingdom is very small in comparison with the net outward movement of British subjects.

Comparison between Emigration and Growth of Total Population.

431. We turn to consider the relation which emigration from the United Kingdom bears to growth of total population, and we give in the diagram below (*a*) the excess of births over deaths as recorded in intercensal periods, and (*b*) the net figures of migration which result from comparison of these figures with the increase of population as shown at each successive census.



432. The principal points to be noticed with regard to this table are these:—

(1) Emigration during the 40 years 1871–1911 absorbed only 27 per cent. of the natural increase of the male population, and in two of the decennial periods the proportion was well below this percentage:

(2) The migration of women in all the decennial periods has been considerably less than that of men, and the average for the whole 40 years has been less than 22 per cent. of the total natural increase of the female population.

433. The individual years from 1911 to 1913 showed, on the whole, an increase in migration, but the broad fact remains that the population of the United Kingdom, until the outbreak of war in 1914, was still growing rapidly, the total increase, even after allowing for emigration, being greater during the decade 1901-1911, as Mr. Harold Cox pointed out in his evidence,* than at any previous period of our history.

Chief Features of recent Migration Figures.

434. To complete our survey of the whole position, we propose to analyse the figures from the point of view of sex, age, and occupation.

435. As we have already indicated, the volume of male migration has been in the past far greater than that of female. In the forty years from 1871 to 1911 590,000 more males than females emigrated from England and Wales alone. It is clear that such a condition of affairs creates undesirable problems both in the United Kingdom and in the Dominions.†

436. We next deal with migration figures in relation to—

(i) The natural growth of the population at different ages and in different parts of the United Kingdom.

(ii) The occupations of those who have emigrated.

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* Cox, Q. 3446, p. 190 of [Cd. 6516].

† The position is more fully analysed in paragraphs 469 to 478 below.

Natural Growth.

437. First, it is necessary to inquire what proportion the volume of migration bears to the natural increase of population not as a whole but at the ages which are of the greatest importance, both as regards the industrial requirements of the Mother Country and the future growth of her population.

Analysing the available figures from this point of view, the Board of Trade Report on Emigration and Immigration Statistics,* published in 1914, estimated that 65 per cent. of the total net emigration of males over 12 in 1913 took place in the age-groups 18–30, and that the proportion had not been very dissimilar since 1901. The same report estimated that in 1913 the net emigration between 18 and 30 was greater than the normal increase by natural growth of population at those ages.† It follows that the large aggregate increase in the population of the United Kingdom, to which we have already alluded, must be mainly in the earlier and later ages of life.

Again, Dr. Snow, who has made a careful study of the figures, estimates that owing to the decrease in the birth-rate, which first began in 1876, having commenced several years sooner than the decrease in the death-rate in the first year of life and in the early years of life, there has been of recent years a reduction in the number of males and females entering the period between the ages 15-30.‡

438. Secondly, signs were not wanting even before the War that the Dominions could not expect any great access of population from Ireland in the near future. The amount of migration from Ireland, both male and female, has been so great that the outward flow was in past years far in excess, and even in 1913 somewhat

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* H. of C. 295, 1914, pp. xii–xiii.
† H. of C. 295, 1914, pp. vi. and xii.
‡ *See* p. 97 of [Cd. 7710].

in excess, of the natural increase of population,* But, whilst this is the case, there is, as was pointed out in our Second Interim Report, a substantial, though decreasing, migration from Ireland, mainly to the United States of America, and it is desirable that steps should be taken to attract as much as possible of this migration to the Dominions. The position in Scotland also needs close attention. The available figures show that in 1901-1911 the volume of migration from Scotland exceeded half the natural increase, whilst for the years 1912 and 1913 it exceeded the whole natural increase. If persons between 18 and 30 alone are considered, it is found that in both Scotland and Ireland the net emigration was more than double the natural increase.

Occupations.

139. There were clear indications before 1914 that the agricultural population of the United Kingdom, on which the Dominions had drawn so largely in past years was no longer capable of providing any considerable supply of migrants.

In the past the coincidence of natural increase of population with a decreased demand for labour (owing largely to the conversion of arable into grass land, and other economic causes) rendered chronic migration either to urban centres or abroad both natural and inevitable. But by 1914 it was generally recognised (and the view is one in which we entirely concur) that the purely rural population of the Mother Country was not in excess of her own necessities. The situation was fully set out in a Memorandum and evidence furnished to the Commission by the Board of Agriculture and Fisheries.† The position as there explained was confirmed by the evidence given by the representatives of the Canadian Pacific Railway Company in Canada. They stated that the Company came to the conclusion that an active campaign in Great Britain to remove men from the farms was a mistake and that they had consequently reduced to a large extent their activities in the Mother Country.*

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* *See* tables and diagrams, p. v. of [Cd. 7528]

† [Cd. 7351], pp. 1-11.

Conclusion.

440. It may be thought that the facts and figures which we have presented above are so affected by the War that they bear no relation to present-day conditions or to after-War problems. We have set them out for the following reasons.

First, it is essential to call attention to the desultory and wholly unsatisfactory manner in which the statistics of migration have been collected and studied in the past. The movement of its population is one of vital importance to the whole of the Empire and it is of the greatest importance that the statistics should be complete and reliable, and should distinguish carefully the ages of migrants and the occupations from which they are drawn.

Secondly, it is unfortunately clear that the havoc of the War will be felt most largely by the population of those ages which have in the past contributed by far the largest proportion of migrants. It will therefore be incumbent on Your Majesty's Government and the Dominion Governments to study those aspects of the migration figures which we have dealt with in the immediately preceding paragraphs far more carefully and scientifically in the future than in the past.

441. In particular the analysis which we have given above brings out clearly the past lack of method in recruiting migrants in the Mother Country, and points to the urgent necessity for reforming the existing system even before the war is over. We are convinced that, unless action is taken by Your Majesty's Government to secure a far greater measure of control, there are possibilities of grave danger in the future.

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* Dennis, Q. 2739, p. 177 of [Cd. 8458].

CONTROL BY IMPERIAL GOVERNMENT OVER EMIGRATION.

442. There are at present several departments of Your Majesty's Government which undertake certain general responsibilities in connection with emigration.

The Colonial Office supervises the Emigrants' Information Office, founded in 1886 to supply impartial information as to emigration, chiefly to the British Dominions overseas.

We feel that hardly sufficient credit has been given to this most useful institution, and we were glad to find that several witnesses in the Dominions acquainted with its methods spoke very warmly in its praise.*

The Board of Trade has charge of emigrant ships, and of the arrangements for hospital accommodation, &c. It also controls (if control it can be called) the passage brokers and passage brokers' agents, whose activities in regard to recruiting we described in our Second Interim Report and deal with in detail below. Finally, it publishes a yearly report and statistical tables with regard to emigration and immigration.

Besides these two departments, the Local Government Board controls the limited emigration of Poor Law children, whilst the Home Office supervises the even more limited emigration of children from industrial schools. As to these classes of emigrants we shall have more to say later on. In addition the Local Government Board has certain functions with regard to migration, of which the precise nature is doubtful, but which have in the past enabled the President of the Board to act as spokesman for Your Majesty's Ministers when matters of emigration were under discussion.

443. We cannot pretend to regard this allocation of business as satisfactory.

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* *See, e.g.*, Trotter, p. 11 of [Cd. 8458].

The emigration officers under the Board of Trade have, no doubt, detailed knowledge of the class of accommodation required by law for emigrant ships, but they are not in touch in any way with the movement of emigration in the inland districts. They have admittedly little or no knowledge of the passage brokers' agents, through whom the bulk of emigration business is carried on. Similarly, the preparation of statistical tables by the Board is only done incidentally and as part of other departmental statistical work.

On the other hand, the Emigrants' Information Office, which has, perhaps, the closest relation to the emigration question as a whole, has no executive authority over passage brokers or brokers' agents, nor has it any means of keeping in touch with those to whom it may have given advice during the period intervening before they start for their destination.

444. The whole system requires revision and reconstruction. In particular, we are convinced that the arrangements under which passage brokers and passage brokers' agents are appointed and are controlled demand radical reform.

Control of Passage Brokers and Brokers' Agents.

445. The present arrangements are, in brief, as follows:—

First, any persons who sell, or are concerned in the selling of, steerage passages to places outside Europe* are known as passage brokers. These brokers, who are largely the head officials of the steamship companies, have to be licensed annually by certain local authorities. They must enter into a bond to the Crown in the sum of 1,000*l.* and they are by law responsible for the acts and defaults of the agents whom they appoint.†

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* Except to places within the Mediterranean Sea.

† Merchant Shipping Act, 1894, 57 & 58 Vict. c. 60, sections 341-4.

Secondly, the actual work of selling steerage tickets is mainly done by passage brokers' agents, who are the nominees of the passage brokers. They hold written appointments which they need not renew annually, and which have only to be countersigned by an emigration officer of the Board of Trade.* They are remunerated chiefly by commission from the transportation companies, and sometimes also from Governments.

446. The fact that, to a passage brokers' agent, an unsuitable migrant is as profitable as, or perhaps more profitable than, a suitable migrant, seems to us a very serious argument against the whole system. We have, however, to recognise that this system is largely used by all the Dominions, and that some employ it almost exclusively.

447. The most apparent defects are these:—

(1) *The laxity in the arrangements for the Appointment of Brokers and Agents.*—The appointment of brokers is regarded as merely formal.† The Board of Trade, though by law it must receive 14 days' notice of an application for a broker's licence, has no effective machinery in use for enquiring into the broker's fitness.‡ One Dominion's Emigration Office has informed us that experience has shown the possibility that passage broker's agents who have had, for sufficient cause, their appointments as agents cancelled, may obtain licences as passage brokers. Brokers thus loosely licensed have the power of appointment of agents, and, though these appointments have to be countersigned by emigration officers, yet brokers may and do appoint agents in such circumstances that the

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* *Id.*, section 315.

† Park, Q. 78, *ff.* p. 4 of [Cd. 7173].

‡ *Id.*, Qs. 6-7, p. 2 of [Cd. 7173].

emigration officer cannot check their appointment.[*]

(2) *The absence of effective Control over Brokers and especially over Passage Brokers' Agents.*—Brokers when licensed give a bond with two sureties for 1,000*l.*, but as some of them appoint a very large number of agents, in some cases up to 2,000 or more, for whom they are responsible, the value of this guarantee is obviously limited. Over passage brokers' agents the Board of Trade has practically no control whatever. We are given to understand that even the very moderate provisions of the Merchant Shipping Act of 1894, requiring lists of agents to be posted in a conspicuous place in the brokers' offices, and copies to be furnished montly to the Emigration Officer,[†] are not in practice complied with. In one notorious case an agent had been known as an offender since 1902 and till 1913 had met with no punishment.[‡]

(3) *The unrestricted Practice of giving Bonuses to Passage Brokers' Agents for securing Migrants of special Classes for the Dominions or for Foreign Countries.*—There is little doubt but that such special inducements in some cases lead to the evils disclosed in the case of "*Rex* v. *Hetherington*," where an agent was convicted of having induced persons to emigrate to a certain foreign country by the false representation that there they would obtain State-aided work.

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[*] Mark Q. 10, p. 2 ; and Q. 103, p. 5 of [Cd. 7173].

[†] Perchant Shipping Act, 1894. 57 & 58 Vict., c. 60, section 346

[‡] Butler, Q. 254, p. 14 of [Cd. 6516].

It is obvious, moreover, that there are possibilities of serious danger when agents can receive bonuses (varying in amount according to the class of emigrant sent out and the place to which he goes), from more than one Government source, as well as from transportation companies.

(4) *The Absence of Legislation to cure the Defect in the Law disclosed in the case of* "Morris *v.* Howden."—In this case, which was decided in the Court of Queen's Bench in 1897, it was ruled that in order to constistute an offence under sections 320, 341, and 342 of the Merchant Shipping Act, 1894, which deal with the sale of steerage tickets, it was necessary for a contract with regard to a steerage passenger to be for a named ship and for a voyage at a definite date. The decision rendered it difficult or impossible to secure the punishment of fraud in cases arising under these sections, if the receipt for the money paid does not specify the name of the ship and the date of the voyage, nor was the difficulty wholly removed by the provisions of the Merchant Shipping Act of 1906* dealing with fraud in inducing persons to engage steerage passages.

SUGGESTIONS FOR REFORM.

448. We proceed to consider how best these defects can be remedied:—

(1) The licensing of passage brokers should be carried out by a Central Emigration Authority, and the licence, which should remain, as at present, annual, should only

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* 6 Edw. 7, c. 48, section 24.

be granted after strict inquiry carried out by means of benches of magistrates and the principal officers of the Board of Trade at the ports. The appointment of passage brokers' agents should be definitely approved by the Central Authority. This approval should only be given after strict inquiry on the lines indicated above, should be annual, and should be revocable at any time if the approving authority is satisfied that the agent is an unsuitable person. The passage broker should retain the right to revoke his agent's authority, but should be required, if he did so, to report his action, and the reason for it, to the Central Authority.

(2) A licence fee should be imposed for each agent appointed by the brokers in order to discourage the appointment of a large number of agents who merely secure the position to earn a chance commission, and have little, if any, inducement to keep themselves posted with information as to suitable openings for migrants, their opportunities and their prospects in various Dominions and in foreign countries.

(3) All authorised agents should be compelled to furnish to the Central Authority not less than seven days before the actual issue of steerage tickets, a list of names, addresses and destinations of intending passengers to any countries that might be scheduled by the Central Authority from time to time. This provision would enable the Authority, if necessary, to check migration to unsuitable countries by supplying intending migrants with correct information as to those countries, thus preventing in some

measure the evils brought to light in "*Rex* v. *Hetherington*," which, there is reason to believe, are widespread.

(4) A beginning should be made of controlling unrestricted bonuses by requiring all agents who book passages to countries scheduled from time to time by the Central Authority, to make a return of all amounts which they receive by way of commission on account of these passages whether from Government sources or from railway or steamship companies.

It ought also to be made a penal offence for a passage broker's agent to take a commission from an emigrant.

(5) All agents should be required to display in their offices any publications, warnings, or notices issued by the Central Authority, and any unofficial publications intended to be issued by agents for the information of intending emigrants should be submitted to the Central Authority for approval. Agents should also be required to bring explicitly to the notice of an intending emigrant to any country outside the British Empire the publications of the Authority affecting his or her case. The passage tickets should be endorsed both by seller and buyer with a statement to the effect that this has been done.

(6) Legislation should be passed to override the decision in the case of "*Morris* v. *Howden*" to which we have already alluded.*

449. The legislation bringing these restrictions and regulations into operation would, of course, have to provide adequate penalties for their breach.

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* *See* para. 447 (4) of this Report.

Control of Emigration Societies.

450. A necessary corollary to these reforms would be a measure of control by the Central Authority over societies engaged in the work of emigration. We are conscious of the excellent work which many of these societies have done; it is, however, obvious that if emigration societies were left unlicensed, while the control over passage brokers and brokers' agents were strengthened, there would be inducements for bogus emigration societies to spring up in order to evade the obligations on those engaged in emigration work as a business.

451. We suggest that the licence should carry with it the obligation to supply the Central Authority with full information as to the society's work. Such information is at present unobtainable, except by the voluntary co-operation of the societies with the Emigrants' Information Office. Yet it is obviously needed for any comprehensive survey of emigration work.

452. The point has been raised in evidence that private emigration societies would object to any measure of control such as that suggested above, unless some corresponding recognition or help were given. The necessity for Government control must, of course, be the paramount consideration. Since, however, the question has been raised, we may point out that already, under the Federal Immigration Law of Canada, no immigrant who is assisted towards his passage by an emigration society or a distress committee is allowed to land in Canada without a written consent from the Canadian Emigration Office in London. This regulation, in our view, involves a larger measure of control than that which we have suggested should be undertaken by the Central Authority. We may also cite the provisions of the Canadian Order in Council passed in 1913 under which

all employment agencies having business dealings with immigrants must take out a licence from the Department of the Interior.

Constitution of a Central Emigration Authority.

453. We have referred several times to the question of control to be exercised by a Central Emigration Authority. We now wish to discuss briefly the general powers and position of such an authority.

Some witnesses before us have advocated the creation of a representative body which would have centred in itself all the functions of Government with regard to migration now scattered over many authorities representing not only the Imperial Government but the Dominion Governments also.

Such a body, in the view of these witnesses, should not only do the work of recruiting emigrants of special classes, now performed by the agencies of the Dominion and State Governments, but should administer funds provided by the Imperial Government for the purpose of encouraging migration, and should allocate those chosen amongst the different parts of the Empire according to the special requirements of each at any given time.

454. There was, however, a considerable volume of evidence in the various Dominions visited, against a policy of concentration of this kind, and we ourselves see considerable objections to so radical a change as this.

First, we are unwilling to support a departure from the traditional policy of Your Majesty's Government, as explained at successive Imperial Conferences, not to encourage State-aided migration on a large scale.

Secondly, it appears to us that any attempt to allocate migrants amongst different parts of the Empire would necessarily excite violent criticism and opposition from those parts which received less than they conceived to be their due, whilst it would certainly not be welcomed by intending migrants themselves, who would find their liberty of selection hampered.

Thirdly, a central representative body would probably lack the detailed knowledge of the requirements of each Dominion which the existing Governmental agencies possess.

455. Co-operation is, no doubt, desirable where possible, and we have been interested in noticing that the States of Victoria and New South Wales have amalgamated their emigration machinery in the United Kingdom since 1913.

There comes, however, a point where divergence of aim and of interests renders co-operation difficult in practice. In our judgment it is better that the Dominions, at any rate at present, should maintain separate organisations in the United Kingdom.

456. The Central Authority must then be limited primarily to the work of migration so far as it concerns the United Kingdom: in other words, it must be under the direct control of Your Majesty's Government. Taking this as a principle, we next inquire what its functions and authority should be.

457. It would be clearly desirable that all the functions connected with emigration now appertaining to the separate departments, as well as the additional duties recommended above, should be centred in the new Authority, except those which are so interwoven with other existing duties that it would be unwise, from an administrative point of view, to separate the strands.

In particular, the duty of disseminating information now centred in the Emigrants' Information Office should be combined with the control of passage brokers and brokers' agents and the supervision of emigration societies, according to the proposals made in paras. 448 to 452 of this Report, and placed under the Central Authority.

There should be added the task of reporting on emigration and immigration yearly from a statistical standpoint, and also the following duties with regard to emigrant ships:—

(1) power to regulate the berthing accommodation, in particular as regards the separation of sexes;*

(2) power to insist on the appointment of matrons to take charge of parties of single women;†

(3) power to secure adequate hospital accommodation, baths, and other sanitary conveniences varying according to the length and character of the voyage;

(4) power to require the employment of experienced medical men according to the length of the voyage and the number of emigrants on board.

As regards the duties just mentioned the Merchant Shipping Acts are somewhat out of date. It does not seem to have been realised that, as one witness put it to us, a large modern emigrant ship is a very big public health problem.‡

458. The question next arises whether the new authority should be the Emigrants' Information Office with extended powers, or a branch of the Board of Trade.

Several of the proposed functions are already carried out by the Board and the additional duties which we have suggested could, no doubt, be assigned to it without great departmental changes. It may also be thought that some of the duties needed, such as the supervision of emigrant ships, could hardly be disentangled from the multifarious functions which the Board already exercises with regard to merchant shipping.

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* *Vide* Second Interim Report [Cd. 7210], paragraphs 41 and 42.

† It appears that an Order in Council could be issued under section 324 (i) of the Merchant Shipping Act, 1894, requiring matrons to be carried in emigrant ships, but at present no such order is in force.

‡ Norris, Q. 14, p. 3 of [Cd. 7710]. Section 303, of the Merchant Shipping Act, 1894, simply provides for the employment of a medical practitioner if (1) the number of steerage passengers exceeds 50 and also (2) where the number of persons on board (including cabin passengers, officers, and crew) exceeds 300. By circular dated January, 1912, the Board of Trade recommended that a second medical officer should be carried when the number of persons on board exceeded 1,500.

It is clear, however, that the Board of Trade is not primarily concerned with conditions in the Oversea Dominions, and, in view of the immense importance of migration to the British Empire, we are impressed with the desirability of keeping, as a separate entity, the office which controls emigration and centres in itself all the information available with regard to its progress and effects.

459. On the whole, we think it would be best to enlarge the Emigrants' Information Office and to make it an independent department of Your Majesty's Government under such Ministerial control as may be found, in practice, most convenient. We accordingly recommend that this should be done.

No doubt it would be in practice desirable that the local administration of many of its powers should be retained, under the supervision of the new Department, in the hands of the principal officers of the Board of Trade at the ports. There are, however, precedents for requiring officers in one Department to do work for another. We may instance the employment of Customs officers on statistical and other work for the Board of Trade, and the extensive duties of the police in connection with the administration of the Regulations for controlling the liquor traffic during the War.

Co-operation with the Oversea Governments.

460. The question of co-operation between the Central Emigration Authority in the United Kingdom and the separate organisations there maintained by the Oversea Governments remains for consideration.

It will be admitted, we think, that such co-operation is desirable and even essential, in order on the one hand to keep the Oversea Governments aware of the progress of the measures to supervise emigration from the United Kingdom, and on the other hand to prevent unrestricted competition amongst the Dominions to attract emigrants from the United Kingdom. In particular all the Oversea Governments which employ passage brokers and passage brokers' agents are deeply interested in the measures for their regulation and control. Similarly Your Majesty's Government is interested in seeing that the schemes for nominated and assisted passages, and the rates of bonus paid, should be co-ordinated.

461. When the subject was discussed at the Imperial Conference of 1911, the speakers on behalf of the Imperial Government[†] took the view that if the Committee of the Emigrants' Information Office were to include representatives of the Dominions, the danger of unrestricted competition might increase. We venture to suggest that, in reality, absence of such representation constitutes a far greater danger.

462. We recommend, therefore, that a Consultative Board to the new department should be set up which would include :—

(1) Representatives of such other departments of Your Majesty's Government as, after the proposed re-organisation is carried out, may still retain functions of one kind or another connected with emigration.

(2) Representatives of the Governments of the Oversea Dominions.

(3) A limited number of non-official members well acquainted with emigration work in the United Kingdom, including representatives of the Committees on Emigration of the Royal Colonial Institute.

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[*] [Cd. 5745], pp. 198–205.

463. As regards representation of the Oversea Dominions we may venture to add the following comments.

In the case of Australia the State Governments deal mainly with emigration from the United Kingdom. Almost all of these have separate organisations and a separate official representative in the United Kingdom. In the case of Canada the recognised organisation in the United Kingdom dealing with emigration is that maintained by the Dominion Government, though several of the Provincial Governments are also concerned owing to the fact that land settlement in all parts of Canada except the Prairie Provinces and a portion of British Columbia is under Provincial control.* In the case of New Zealand there is only one official organisation in the United Kingdom dealing with emigration, viz., that maintained by the Dominion Government.

This diversity of representation would no doubt cause difficulty if any measure of executive control were entrusted to the new Board. If, however, its main functions are (as we think that they should be) to make certain that the problems arising in the control of emigration are considered in relation to the requirements not only of the United Kingdom but of the Oversea Dominions, the chief object will be to secure that every part of the Empire which is interested in emigration shall be suitably represented, and the actual number of members representing each of the oversea parts of the Empire will not be of importance.

464. We emphasise that the responsibility for the administration of the work of the proposed Central Emigration Authority should rest with the Imperial Government.

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* *See* p. 10 of [Cd. 8457].

EMIGRATION OF CERTAIN CLASSES FROM THE UNITED KINGDOM.

465. We proceed to consider questions connected with the emigration of certain classes of the community.

(i) Men.

466. In the case of men, the fundamental problem appears to us to be this.

In the past, no power has existed, nor has any effort been made, to regulate emigration from the United Kingdom. It has only been questioned whether the time has not arrived when Your Majesty's Government should deprecate, or discourage the grant by the Oversea Governments of special assistance towards, the emigration of particular classes, for example agricultural labourers. On this, however, as on countless other questions, public opinion has been sensibly altered by the War. It is certainly a matter for serious consideration whether the new Central Emigration Authority which we propose should not have power reserved to it to limit, or prohibit, the emigration of men, particularly men of military age, from the United Kingdom, except to destinations approved by the authority. We do not propose to make any definite recommendation in our present ignorance of what the state of affairs will be when the war is over. This is a question on which few would care to prophesy. Everything depends on the conditions then existing, which it is now impossible to foresee; for example, on the number of men required to build up again the industries of the United Kingdom and of the neighbouring Allied countries, and, most of all, on the number of men still available, and on the military exigencies of the time. We would simply point out that the question of the extent to which emigration of the male population from the United Kingdom can be permissible will be of vital importance to the future of the Empire, and that the most careful and scientific study, more particularly of the considerations mentioned in paragraphs 437 to 439 of this Report, will be needed before any line of policy is adopted.

LAND SETTLEMENT OF EX-SOLDIERS.

467. The question of the emigration of ex-soldiers, and their successful settlement on the land, is, however, one which is already attracting public attention in all parts of the Empire. It has also been the subject of special enquiry and local study by one of our members. Further, the principles on which such emigration as there may be should be conducted is now, we understand, engaging the attention of Your Majesty's Government and the Oversea Governments. We feel justified, therefore, in putting forward briefly such conclusions as we have ourselves been able to form on the matter:—

(1) We did not see during our visit to Canada, nor, so far as we can gather, is there in the other self-governing Dominions, any strong immediate desire on the part of ex-soldiers to return to the land. On the contrary, we found that some of those who had previously worked on the land showed no inclination to return to it. It must be admitted, however, that experience so far has been confined to men who have returned suffering from either injuries or shock, and that this experience may not be a safe guide to the future.

(2) Even granted that military and other exigencies permit of male emigration after the war is over, it seems likely that the available shipping accommodation will be so taxed to provide for the Dominion troops returning to their own homes that there will be no room, for some considerable time, for other intending emigrants.

(3) If, however, the Governments of the Dominions overseas undertake special schemes, such as are now under consideration, for the settlement on the land of their own ex-service men, we think it most desirable that, where land is available, these schemes should be extended later on to ex-service men who can be spared from the Mother Country. Indeed, we gather that this is the present intention of the Governments of most of the Oversea Dominions.

(4) We are strongly of opinion that if such schemes are to be a success they will have to provide for preliminary training in agricultural methods in the Dominions concerned, and also for the supply on easy terms of the capital and equipment needed by the intending soldier settler for the profitable cultivation of his land. We also emphasise the need for such precautions as will secure continuous occupation, and prevent speculative sales, of the lanas allotted for settlement.

(5) While each scheme for the settlement of soldiers will have to be, in our opinion, under the undivided control of the Government concerned, whether in the United Kingdom or the Dominions, we think that it will be essential to take steps for the co-ordination of the various schemes. The Consultative Board to the new Central Emigration Authority in the United Kingdom, which we have recommended above, should have great scope for useful work in this direction, particularly if it gets into full working order before the war is over.

(6) If it is found that there is scope for the settlement in the Dominions of ex-soldiers from the United Kingdom, special machinery may be necessary in order to assist applicants in choosing between the opportunities offering in the various Dominions. For this purpose the Consultative Board to the Central Emigration Authority would be of special use since it could arrange, either directly or through sub-committees, to have preliminary interviews with applicants and subsequently to hand them over to the office of the Dominion or State of their choice. We would add that, in our opinion, a distinct preference should be given in such settlement schemes to married men, or to those who have sisters or other female relatives to accompany them.

(ii) Women.

468. The question of the emigration of women stands in an entirely different position to that of men.

The basic fact is that, in 1911, there were in the United Kingdom 1,329,000 more females than males, and in the self-governing Dominions 762,000 more males than females.

The surplus in the United Kingdom is unfortunately increasing under war conditions, and it is likely to be still more marked before the war is over. In the Dominions, on the other hand, the war has caused, temporarily at any rate, some alleviation of the disproportion.

The problem for solution is whether it is desirable, and if desirable, possible, to divert to the Dominions any proportion of the surplus of women in the Mother Country. It is one which clearly needs treatment on scientific lines. We have been fortunate in obtaining help from a Committee of the Royal Statistical Society,* and from the two investigations conducted on our behalf by Dr. E. C. Snow.†

The main results of these inquiries are as follows.

Surplus available in the United Kingdom.

469. The question whether there is a surplus of female population in the United Kingdom under normal conditions available for migration is one of much complexity. On the one hand, it does not lend itself to a general answer which could have any pretence to completeness. On the other hand, many partial answers may be given which may claim attention as representing definite points of view.

The question may be discussed under the following heads:—

(1) The ages of the surplus women.
(2) The causes of the surplus female population.
(3) The demand for unmarried female labour.
(4) The proportion of the unoccupied to the total unmarried female population in normal times.
(5) The prospects of marriage.
(6) The effect of the war on the position.

(1) *Ages of the Surplus Women.*

470. As we pointed out in our Second Interim Report, much of the surplus of females consists of elderly women.‡ Thus, in England and Wales, there was in 1911, at ages under 15, an actual excess of males amounting to 11,000§; between 15 and 45 there was a surplus of females amounting to 663,000‖;

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* *See* pp. 81–83 of [Cd. 7710].

† *See* pp. 58–86 of [Cd. 7173] and pp. 83–123 of [Cd. 7710].

‡ *See* pp. 11–12 of [Cd. 7210].

§ 0·2 per cent. of the total male population under 15.

‖ 7·4 per cent. of total number of women between those ages.

at ages over 45, the surplus of women was 527,000.* As the emigration of women above the age of 45 is not desired by the Dominions, opinions formed as to the number of the female population in the United Kingdom available for migration upon the basis of the figure of 1,329,000 for the surplus at all ages, require very considerable modification.

(2) *Causes of Surplus Female Population.*

471. It is a noteworthy fact that in every country for which vital statistics are available more male than female children are born. On the other hand, there is a higher mortality rate amongst males than amongst females, practically throughout life.†

This point may be illustrated by figures as follows:—

Between 1870 and 1910, 657,000 more boys than girls were born in England and Wales.

During the same period, 651,000 more males than females died.

Practically all the *increase* in the excess number of females over males at all ages in England and Wales between 1871 and 1911 was caused by the excess of male over female migration. This latter excess amounted to 590,000.‡

(3) *Demand for Unmarried Female Labour.*

472. Two processes are going on with regard to the employment of women. First, the total number of

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* 12·8 per cent. of the female population over 45.

† *Note.*—The mortality rates amongst males and females do not appreciably differ, however, between the ages of 5 and 15.

‡ *Note.*—It is interesting to notice that, whilst the same process is at work in Scotland, the volume of female migration from Ireland is very little less than that of male migration. In fact, in the United States of America, according to the last census returns, there were nearly 130,000 more females than males of Irish origin.

unmarried women who are employed is rapidly increasing. Secondly, employment is ceasing to be only in domestic work.

The numbers of unmarried women in England and Wales (from the age of 15 upwards) engaged in other than domestic work increased in the decade 1901-11 from 1,924,000 to 2,424,000, or by 26 per cent.

On the other hand, during the same period the number of unmarried domestic servants only increased from 1,129,000 to 1,133,000, or by 0·4 per cent.

In fact, the proportion of domestic servants to the total population decreased from 3·47 to 3·14 per cent. during the period 1901-11. In other words, if the proportion of 1901 had been maintained 119,000 more domestic servants would have been employed in England and Wales in 1911 than were actually found to exist.

473. The change appears to have occurred chiefly in districts of lower social status, particularly in some parts of London and in Lancashire, where women find, even in normal times, many opportunities of non-domestic work.

On the other hand, the percentage of domestic servants employed was large, not only in districts of high social status, as would have been expected, but also in mining districts, &c., where the opportunities for non-domestic female employment are normally small, and where the general rate of men's wages is comparatively high.

It would seem that the shortage of domestic servants so often complained of varies much from district to district, and that migration has been the minor factor in inducing it, the major factor being the increasing competition of new and freer methods of remunerative employment.

(4) *The Proportion of Unoccupied to the Total Unmarried Female Population.*

474. Taking again the unmarried female population over 15 in England and Wales, we find that their numbers were 4,555,000 in 1901 and 5,110,000 in 1911, the increase in the 10 years being 555,000 or 12·2 per cent.

Of these, the number unoccupied rose from 1,502,000 in 1901 to 1,553,000 in 1911, an increase of 3·4 per cent. only.

The proportion of unoccupied to occupied decreased during the decade by 2·6 per cent.

Nevertheless these unoccupied unmarried women in 1911 still formed more than 30 per cent. of the total unmarried female population over 15. Many of them, as would naturally be expected, were to be found amongst the richer classes of the community. Otherwise, so far as can be judged from available statistics, they were to be looked for mainly in the mining, shipbuilding, and engineering areas.* The lowest percentage of unoccupied unmarried women was to be found in the textile areas and in the lower-class London districts.

(5) *Prospects of Marriage.*

475. Analysis of the available figures from the point of view of marriage prospects showed that 1,271,000 unmarried women in England and Wales who were between the ages of 15 and 44 at the Census of 1911, and 925,000 men between the same ages, were likely to reach the age of 45 without marrying. Even if it is assumed that, owing to special circumstances, many of these men and women have since married, there would remain at least 346,000 women of ages suitable for migration with no statistical prospect of marriage.†

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* *Note.*—Apart, of course, from those areas where other trades exist concurrently, which need female labour.

† *Note.*—This figure would be slightly decreased if the figures for the United Kingdom were taken.

(6) *The Effect of the War on the Position.*

476. It seems clear that, whilst for the moment the unoccupied unmarried woman is hardly to be found, the effect of the War, broadly considered, must be to increase the surplus of women in the United Kingdom at ages suitable for migration.

The excess of females over males at all ages, but particularly at ages between 15 and 45, is unfortunately becoming more marked. Again, whilst the prospects of marriage have increased, as well as the actual number of marriages, the number of widows is considerably increasing also.[‡]

Distribution of Women in the Dominions.

477. We next consider the question from the point of view of the Dominions. In their case the questions at issue are less complex, but the investigations have disclosed the following points of interest:—

(1) *Proportionate Excess of Male Population.*

The excess of males in the Dominions judged by the Census of 1911 was about 6 per cent. of the total population, as compared with an excess of 3 per cent. of the female population in the United Kingdom. In other words, the need for decreasing the disproportion of the sexes was more urgent in the Dominions than in the United Kingdom. always provided that the former have facilities available for absorbing an additional female population.

(2) *Ages of Surplus Men.*

The question of the age of the surplus of males in the Dominions is just as important as that of

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[*] In this connection, however, it is interesting to note that, in the United Kingdom particularly, and to a somewhat less extent in the Dominions, the young widow has a better prospect of remarriage than has the spinster of marriage.

the surplus of females in the United Kingdom. At ages under 15, in 1911, the surplus of males in the Dominions was 55,000 or 2·4 per cent. of the total male population under that age. Between 15 and 45 it was 484,000 or 13·3 per cent. of the male population between those ages, while at ages over 45 the surplus was 198,000 or 14·4 per cent. of the male population over that age. While the analysis of the surplus of females in England and Wales according to age shows the available excess for emigration to be smaller than that indicated by the aggregate figure, similar analysis for the Dominions discloses that the excess of men in 1911 was greatest amongst the middle-aged and the old. In other words, whilst the evil of disproportionate numbers of the sexes is, in both cases, a real one, gross figures exaggerate it.

(3) *Distribution of Surplus Male Population.*

Geographically, the excess of males in the Dominions in 1911 was very unevenly distributed. In fact, in many urban districts females predominated.

Thus in metropolitan Australia there were 1,082 females to every 1,000 males (a number higher than that for England and Wales as a whole and approximating to that for the chief county boroughs), and in the four chief towns in New Zealand the corresponding figure was 1,032 females to 1,000 males. Even in Canada, where the excess of males was more marked than in Australasia, the number of females in towns over 15,000 was 948 to every 1,000 males in comparison with 866 females to every 1,000 males for the whole of the Dominion.

In marked contrast were the disproportionate numbers of the sexes in the country districts. In

Western Australia, outside Perth, there were in 1911 only 618 females to every 1,000 males. In British Columbia, outside the towns, there were but 511.*

This disproportion appears to be due not only to the fact that many men in the country districts were unmarried, but that many married women lived in towns in the Dominions whilst their husbands were at work in the country.

(4) *Results of Disproportionate Emigration of Men.*

Emigration from the United Kingdom, as we have shown above, has been much larger in the case of men than of women. Correspondingly the Australian Census of 1911 disclosed that of persons of less than four years' residence in the Commonwealth, there were only 320 females to 1,000 males in the age group 15 to 24, and only 403 to 1,000 in the age group 25 to 44. The figures illustrate clearly the need for the migration of a greater proportion of younger women.

(5) *Advantages of Migration of Younger Women.*

A further argument in the same direction is the fact that if women can be emigrated to the Dominions in the earlier years of life, say 15 to 19, they are likely to contribute considerably more to the next generation (and much more to future generations) than the same women emigrated 10 years later in life.

478. When we come to consider the effect of the War on the position in the Dominions, it is clear that the absence from their homes of large numbers of men serving in the contingents has decidedly decreased the

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* *Note.*—In both cases, it must, of course, be remembered that mining industries predominate.

surplus of males overseas.* We think, however, that the uneven distribution of male and female population between the country and the cities lies at the root of the problem and that this distribution is not likely to be affected materially or permanently by the conditions arising out of the War.

Conclusions and Recommendations.

479. We have thought it well to set out in some detail the main results of our investigations, as we believe that the essential facts disclosed have not hitherto been recognised, whilst knowledge of them is obviously needed before a sound policy can be framed.

480. Certain conclusions emerge clearly. First, if an *equal* migration of males and females from the United Kingdom could be assured after the War, there is no great likelihood that the surplus of female over male population in the Mother Country would become larger.†

Secondly, if the conditions of life overseas should make it possible for the Dominions to adopt the policy of ensuring the migration of the sexes in equal numbers, and particularly if they could increase the numbers of younger women emigrating, they would be doing much to increase their population in the next and succeeding generations.

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* *Note.*—It should be noted, however, that large numbers of women and children have been coming to the United Kingdom from the Dominions, particularly from Canada, during the War, presumably for temporary residence, *i.e.*, to be near their relations and friends at the front.

† *Note.*—The relatively high proportion of male to female births has decreased somewhat in the last few decades. Thus in England and Wales in 1841-5, 1,052 boys were born to 1,000 girls, and in 1836-1900 only 1,035 boys to 1,000 girls (with a slight rise since). There has also been a steady relative rise in male over female mortality during the last 10 years. But the natural tendency is for males to increase in more rapid proportion in countries where females are in excess and *vice versâ*. The principle stated may be taken, therefore, as approximately accurate.

Thirdly, whilst the demands hitherto made by Canada, Australia, and New Zealand have been almost exclusively for domestic assistance, the figures show clearly that in the Mother Country there is not a large number of domestic servants who can be drawn upon to supply the requirements of the Dominions. In some districts there is even a deficiency. It follows that to obtain the necessary supply other means must be adopted and other sources tapped. Recruits must be sought for either amongst those who are engaged in other ways than domestic service, or are at present amongst the percentage of the unmarried female population which till recently was unoccupied.*

Fourthly, the problem in the Dominions is largely one of better distribution of female population between town and country. If, therefore, the Dominions as they develop can absorb greater numbers of women in their country districts, they will have taken a decided step towards the solution of many problems.

RECOMMENDATIONS.

481. Any recommendations for increasing the migration of women must, of course, be always subject to the proviso that the conditions of the Dominions for the time being enable them to absorb the numbers sent out.

Further, it cannot be expected that the United Kingdom will be willing to spare any large numbers of its own unmarried female population at the present time when so many who are normally unoccupied are engaged in munition and other work usually done by men.

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* *Note.*—It appears that in the districts where there is normally the largest proportion of unoccupied women the chances of marriage are greatest. This is explained in various ways:—That women marry because they are unoccupied, that they are able to marry because they devote time to it, and that they seek occupation in default of marriage.

482. We desire, however, to suggest certain measures which would, we think, be instrumental in carrying the conclusions which we have set out above into practical effect as soon as the War is over :—

(1) As a matter of Imperial policy the Dominion Governments should devote a large part of their activities to, and give increased facilities for, the migration of women, especially young women, with a view to better sex distribution.

(2) It would be desirable not to confine the facilities offered to those who have experience of domestic service, but to extend them both to women previously unoccupied and to those who are engaged in other than domestic occupations, provided that satisfactory arrangements can be made for training them for the occupations open to them in the Dominions. To the need for such arrangements we refer in more detail below.

(3) Women's Emigration Societies should be encouraged to proceed on similar lines, and societies other than those which concern themselves solely with female migration should equally devote their chief energies to the migration of women, especially younger women.

(4) From the point of view of the Dominions, however, the ideal will be only attained if the women sent out are such as will consent to live in the rural districts in the Dominions, and have the necessary qualifications to fill the demands there.

We may here note that the adaptability which women of all classes in the United Kingdom have shown during the War and the experience which they have gained in manifold occupations, and especially in agricultural pursuits, will render them much more suited for life in the country districts than before. Many also will have had experience in nursing and similar work, which would render their presence in the remoter parts of the Dominions of special value.

(5) It appears to us, however, that arrangements ought to be made for some sort of elementary training, suitable to prepare women, particularly younger women, for life in the country districts in the Dominions, and especially for domestic work there.

We do not think that such training can be given with advantage in the Mother Country, and we would therefore advocate the establishment in the Dominions of domestic science training schools for immigrants where instruction would be given, more especially in general domestic work. Household assistance of this kind is, as we have shown in our Interim Reports, most largely required in the Dominions, not the skilled and particularised service so often learned in the Mother Country.

(6) We also consider that, in the Dominions, urgent attention is necessary to two things:—

(*a*) The creation and development of societies which will not only make suitable arrangements for the accommodation of women migrants on arrival (in the absence of Government provision for this purpose) but will also assist in placing and protecting women in the country districts.

Several such societies already exist, and have done good work, but they require expansion.

(*b*) The provision of improved accommodation for families in the country districts.

(iii) Children.

483. We have already, in our Second and Fifth Interim Reports,* expressed our opinion on the advantages and disadvantages of Family Migration, and we do not propose to touch on the subject again here. Nor need we dwell on the work which is being done by the various societies already engaged in promoting the emigration of children. We can only repeat that, in our view, youth and adaptability are the most needed requirements in emigrants. Granted, therefore, the requisite arrangements for training and looking after those of tender years (which, we are happy to think, the societies endeavour to perfect by all means at their disposal), there is no form of migration of greater advantage than this to the Empire as a whole.

Migration of State Children.

484. We wish, however, to examine in some detail a possible source of supply of population to the Dominions, of which in recent years little use has been made, namely that of children under the care of the State and Local Authorities in the United Kingdom.

These children may be classified into three groups:—

(1) Those under the care of Poor Law Authorities.
(2) Those in industrial schools.
(3) Those in reformatory schools.

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* [Cd. 7210], pp. 13–14, and [Cd. 8457], p. 12.

Poor Law Children.

(1) In England and Wales.

485. The number of Poor Law Children in England and Wales, though it has decreased somewhat in recent years, is still between 200,000 and 250,000. We give below the figures of those in receipt of relief on January 1, 1914.*

——	Unions in London.	Unions outside London.	Total England and Wales.
Indoor :—			
Orphans or children relieved without parents	8,049	24,891	32,940
Other children	11,807	23,292	35,099
Outdoor :—			
Orphans or children relieved without parents	662	11 249	11,911
Other children	11,753	142,984	154,737
	32,271	202,416	234,687

NOTE :—Boys and girls up to 16 years of age are classified as children in the above table.

We understand that statistics are not available to show the numbers of boys and girls respectively included in the totals. We suggest that the Local Government Board should take an opportunity of rectifying this omission, which is of some importance.

486. Children receiving Poor Law relief may be divided roughly into two classes—those relieved without their parents (who are, in the main, orphan and deserted children, or "adopted" by Boards of Guardians) and those relieved with their parents, who, it will be seen, outnumber the others in the proportion of four to one.

We proceed to deal separately with these two classes of children.

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* *See* H. of C. 278 of 1914, p. xiii.

ORPHAN, DESERTED, AND ADOPTED CHILDREN.

487. The powers of Guardians with regard to migration extend primarily to orphan, deserted, and adopted children only,* since the other children remain under parental control.

It will be found on reference to the table above that they number nearly 45,000. Of these, some 33,000 receive indoor relief or are maintained in workhouses, infirmaries, homes, schools and other special institutions. The 11,911 classed as in receipt of outdoor relief are mainly boarded-out children.

488. The total of 45,000 includes a certain number of very young children, and a certain proportion of invalid and defective. No precise figures exist as to the number of these, and opinions of persons qualified to judge vary considerably. To obtain a rough guide we wrote to about 30 Boards of Guardians (the list being suggested by the Director of Dr. Barnardo's Homes) and asked for the numbers of orphan, deserted, or adopted children under their care, distinguishing those under five years of age, and distinguishing also between healthy and defective children.

489. Figures were received from 20 Unions, covering a group of 2,610 orphan, deserted, and adopted children. Of these 307 or 12 per cent. were stated as under five years of age; of those above that age 271 or 10 per cent. were classed as "invalid or defective," whilst the remaining 2,032 or 78 per cent. were returned as "normal and healthy." *Primâ facie* therefore if the age line is drawn at 5 years, nearly 80 per cent. of the total body of orphan, deserted, or adopted children would appear, as regards age and health, to be suitable candidates for migration. The age limit may appear to be low, but it seems probable that if Boards of Guardians are to be induced to make more extended use of migration as a means of finding careers

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* Burns, p. 188 of [Cd. 6516].

for the children under their care, comparatively young children will have to be taken into account. We notice too that the Chief Inspector in Canada of British Immigrant Children and Receiving Homes said in his Report for 1912-13, "The ideal ages at which to send children to Canada are between 5 and 15 years."*

490. On this basis we find that there is a body of above 35,000 orphan, deserted, and adopted children in England and Wales alone from which a supply of migrants could be drawn. As this figure relates to ages between 5 and 16 there must be a very large number immediately available, whilst the number which would become available in each succeeding year would probably be about 3,000.

OTHER POOR LAW CHILDREN.

491. Though, as we have indicated, there are nearly 200,000 Poor Law children other than those who are orphan, deserted, and adopted, there are great difficulties in forming even an approximate estimate as to the number available for migration.

On the one hand it may be argued that owing to the existence of the large class known to Poor Law authorities as "ins and outs" the figure of 200,000 does not include the whole number of potential migrants amongst those for whom Boards of Guardians, at one time or another, are responsible.

On the other hand it may be contended that a great many of the 200,000 are in receipt of relief for a short time only, that in ordinary circumstances they do not need extraneous help, and that Boards of Guardians cannot be expected to aid them towards migration. In the absence of available statistics, no good purpose would be served by pursuing further either of these arguments. We can, however, say generally, that our enquiries satisfy us that a large percentage of the children between 5 and 16 who are classed as receiving indoor or outdoor relief (quite apart from orphan, deserted, and adopted children) are normal and healthy, and form a further source of supply, provided that the consent of their parents can be secured.

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* Department of the Interior, Dominion of Canada. Report by G. Bogue Smart for the year ending March 31, 1913, p. 6.

SUITABILITY.

492. It may be argued that, even assuming large numbers are available, Poor Law children by habit and training are not suited for life in the Dominions. Such, indeed, seems to have been hitherto the view taken in Australia and New Zealand, where, as yet, practically no experiments in receiving Poor Law children have been made.*

But such is not the view held in Canada, where an organised system exists for placing out, and inspecting periodically, the Poor Law children sent out.

Nor, indeed, is it the view held by those of the greatest experience in the Mother Country. On the contrary, the Guardians are loth to part with children whose training has fitted them for useful service at home. "Poor Law children," we were told, "by virtue of the excellent training they receive, the good "food, the good accommodation, and the good educa-"tion they undoubtedly get, are in very great "demand in the Mother Country."†

PRESENT ARRANGEMENTS FOR MIGRATION.

493. We pass on to consider the arrangements now in force for the emigration of Poor Law children. Guardians have power to emigrate children, whether orphan, deserted or adopted, or not, but the present organisation relates solely to those of the former class,

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* P. 84 of [Cd. 7171].

† Burns, p. 188 of [Cd. 6516].

and only to those who go to Canada. This organisation may be summarised thus:—

(*a*) Boards of Guardians carry on the work through recognised emigration societies, subject to the general control of the Local Government Board.

These emigration societies are responsible, not only for the children's outward passage to Canada, but for receiving them on their arrival, and placing them out in approved homes, and generally for supervising them up to the age of 16 (or, in some cases, 18). The children sent out have to undergo previously a six months' course of instruction. The Local Government Board take the view that there is no statutory limitation to the expenditure which Guardians may incur in respect of this emigration.

(*b*) By the provisions of an old statute,* orphan and deserted children have to give their own consent to emigrate before Justices in Petty Sessions. In the case of children "adopted" by the Guardians, not only is this formality required, but unless the parent consents to the child's migration the Local Government Board require an assurance from the Guardians that the child will be brought back to the Mother Country in the event of a successful appeal by the parent or parents, under section 1 (2) of the Poor Law Act, 1899.†

(*c*) The children are inspected annually by officers of the Dominion Government until they reach the age of 16. Reports of these inspections are forwarded to the Guardians.

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* 13 & 14 Vict. c. 101, section 4.

† 62 & 63 Vict. c. 37: *see* Morris, Q. 2691, p. 138 of [Cd. 6516].

(*d*) The expense of the first of these inspections is paid by the Dominion Government. That of the subsequent inspections is paid by the Guardians.

The scale of charges is fixed, but varies according to the number of years in respect of which inspection has to be made. Thus, if a child when sent out is between 14 and 15 years of age, the charge is only 1*l*. 4*s*. 8*d*. If, on the other hand, the child, when sent out, is between 4 and 5, the total charge for inspection comes to 10*l*. 14*s*. 9*d*.

(*e*) The Local Government Board is not empowered to authorise the payment by Guardians of the cost of maintaining children sent out.

494. In spite of this somewhat elaborate organisation, the numbers of Poor Law children sent to Canada are still extremely low. The following table shows the numbers during the five years ended in 1913:—

——	1909.	1910.	1911.	1912.	1913.
Boys	315	396	434	370	402
Girls	107	138	183	122	166
Total	422	534	617	492	568

SUGGESTED IMPROVEMENTS.

495. We ourselves are strongly in favour of the view (which several witnesses expressed to us*) that more activity is desirable in sending out Poor Law children. We believe that they form some of the best material available, and that every possible measure should be taken to stimulate this form of emigration.

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* *e.g.*, Rawson, p. 138; Grey, p. 181 of [Cd. 6516].

It is clear that, in Canada alone, the demand for such children is far in excess of the supply, and we are satisfied from the evidence tendered to us that there is no reason to think that the children now sent out suffer any want of care after their arrival in the Dominion.

496. What then are the obstacles? One, we think, is a certain want of imagination on the part of the Guardians. They do not realise the bright prospects which migration holds out to the children under their care, who are likely to benefit in a special manner by a change of environment.

Another is the considerable immediate expense involved, and the need for inspection payments afterwards. It is not understood that the expenditure on the child, if he or she stays under the Guardians' direct charge, is out of all proportion to that involved by migration overseas.*

Both obstacles are, it would seem, easily surmountable, if Guardians are properly advised as to the position.

497. Taking the system as it is at present, we are satisfied that it is susceptible of improvement in various ways. For instance—

(*a*) The present arrangements are described in a number of somewhat complicated circulars from the Local Government Board to Boards of Guardians, the earliest of which is dated 1898 and the latest 1910. It is desirable that these circulars should be unified, simplified, and brought up to date.

(*b*) We do not think that either the consent before Justices of orphan and deserted children, or, in the case of "adopted" children, the additional assurance to which we have referred above (of action on which, we may add, there is no known* instance) adds any additional safeguard to the investigations of the Guardians and the control of the Local Government Board. These restrictions should be removed by means of amending legislation.

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* *See* Grey, p. 181 of [Cd. 6516].

(*c*) As we have shown, the Guardians at present pay the cost of the annual inspection of the child (except the first), in return for which a copy of the Inspector's Report is sent to them. We are inclined to adopt the view put to us in evidence by Lord Grey, that the value of the child to Canada is such that the Dominion Government might well pay the whole cost of inspection. This cost is already paid by the Dominion in the case of children from Industrial and Reformatory Schools.

(*d*) The Local Government Board should make arrangements, in consultation with the Oversea Governments, to extend the system of "placing out" and inspection now in force in Canada to Australia and New Zealand.

(*e*) The migration of girls now under the care of Boards of Guardians should be encouraged to a special degree. The present system is another example (of which there are only too many) of unequal sex distribution. It is one, moreover, in which the remedy is particularly easy.

Concurrently, Women Inspectors should be appointed in the Dominions to visit and report on the progress of the girls.

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* P. 206 of [Cd. 6516].

(2) In Scotland.

498. The figures published by the Local Government Board for Scotland for 1913 showed 2,517 orphans, 1,527 deserted children, and 4,517 children separated from their parents by order of the Parish Council or by law. There were also more than 30,000 children who were classed as dependents.* Undoubtedly a good number of these children would be suitable for emigration, but at present an insuperable difficulty exists in that Scottish Parish Councils have not even the very limited powers as regards emigration now exercised by Boards of Guardians in England and Wales.

The majority of the Royal Commission on the Poor Laws and Relief of Distress recommended in their Report on Scotland, though with some hesitation, that provision should be made for the emigration of suitable children from Scotland to the Colonies, the responsibility of the public assistance authorities and Parish Councils to continue for a stated period thereafter.†

So far as we know no effort has been made to carry out this recommendation which, in view of the special aptitude for life in the Dominions which the Scotch appear to possess, we endorse without any qualification. We hope that the necessary legislation may be introduced immediately circumstances permit, and that it may be so worded as to permit of the freest possible action by Parish Councils in Scotland in promoting the emigration of children.

(3) In Ireland.

499. Various Acts are in force in Ireland empowering emigration by Boards of Guardians, and those

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* Pp. xvi., xvii. of [Cd. 7327].

† P. 139, paragraph 318 (3) of [Cd. 4922].

assisted under the provisions of these Acts up to March, 1913, included 18,000 children.*

In view of the position with regard to emigration from Ireland, which we have alluded to earlier in this Report, we do not desire to make any recommendations in favour of the further extension of child emigration from that part of the United Kingdom, but what we have said above as to the attraction of Irish emigrants in general to the Dominions, applies particularly in the case of children.

Children from Industrial Schools.

500. Children in industrial schools form a class very closely akin to that of Poor Law children with which we have just been dealing.

Industrial schools receive children suffering from cruelty or neglect, or otherwise considered to be in moral danger. Most of them are managed by voluntary bodies; a few have been established by local authorities in the United Kingdom. They are not managed by the Government, but part of their funds consists of Treasury Grants, and the Home Office has an indirect and limited control.†

501. The inmates of Industrial Schools in England, Wales, and Scotland number over 15,000, the latest figures available being—

Boys	11,343
Girls	4,287
Total	15,630

502. The managers of such schools are by law empowered to emigrate children who have behaved well and who wish to emigrate. They act through recognised agencies such as the Children's Aid Society. So

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* Emigration Statutes and General Handbook issued by the Emigrants' Information Office. 1914 Edition, p. 30.

† The details are described in the Report of the Departmental Committee on Reformatory and Industrial Schools. [Cd. 6838.]

far the power has been exercised to a very moderate extent. The figures for the five years ended in 1913 are as follows:—

——	1909.	1910.	1911.	1912.	1913.
Boys	144	109	117	133	128
Girls	75	55	62	61	48
Total	219	164	179	194	176

503. There is no doubt that the training which these children receive is of a kind which would be most useful to intending emigrants. In girls' schools housework, cooking, and laundry-work and sewing are the main occupations. In boys' schools the most common form of industrial training consists of work in the carpenter's, bootmaker's, and tailor's shops. Plumbing and metal work is also common, whilst many of the schools are farm schools, where boys receive practical training in the care of cattle, dairy work, gardening, and outdoor work generally.

From the physical standpoint the large majority of the children would be suitable for emigration.

504. The Oversea Governments would be well advised to make inquiries of the various schools through the Home Office as to the number of children (and especially the number of girls) who are recommended and ready for migration, and even to arrange for special experiments in receiving and placing them.

From inquiries which we have made we find that some 2,700 boys and 800 girls are discharged in each year to various occupations from industrial schools.

Children from Reformatory Schools.

505. Reformatory schools stand in a somewhat different category. They are all managed by voluntary bodies; their relation to the State is identical with that

of industrial schools; and the training which they provide is similar. The distinction is that their occupants, unlike those of industrial schools, have been convicted of offences.

The number of children in reformatory schools is smaller than that in industrial schools, the latest figures being:—boys, 4,132; girls, 599; total, 4,731.

506. The numbers emigrated from these schools are extremely limited. The figures for 1909-13 were:—

—	1909.	1910.	1911.	1912.	1913.
Boys	26	29	26	55	50
Girls	4	1	1	2	0
Total	30	30	27	57	50

507. It is possible that the previous history of the occupants of reformatory schools may cause them to be regarded with suspicion from the point of view of emigration. We should, ourselves, take a broader view. The offences are often the result of undisciplined spirits and are no bar to the display of pluck, energy, and steady industry in later years. We understand that the great majority turn out well in after life.

We recommend that the same facilities as those which we have suggested above should be extended by the Oversea Governments to these children also. About 1,400 boys and 170 girls leave reformatory schools in an average year.

Advantages of the Migration of State Children.

508. The history of the migration of State children has been marked, like other phases of migration, by violent fluctuations of public opinion. Sometimes the removal of these children to a new sphere and new surroundings has been thought a panacea; at other

times it has been regarded simply as a condemnation to slavery. Anyone possessing the slightest acquaintance with the conditions of life in the Dominions would indignantly scout the second of these suggestions, and before concluding this branch of our Report we desire to place on record our own views on the question.

Our belief is that, while all young emigrants have great chances of success, those whose surroundings in early life have not been normal, and whose environment has not been healthy, are likely to benefit to an especial degree by the freer life in the Dominions.

In our judgment the risk involved is inappreciable, and the gain exceptional. We would, therefore, urge generally that the Government Departments and local authorities in the United Kingdom should pay greatly increased attention to the whole question of the possibilities which migration offers to the children under their charge, and equally we would call the attention of the Oversea Governments to the advantages of this potential supply.*

Conflict of interest is absent to a remarkable degree. The migration of such children is of benefit alike to the senders and the receivers.

UNIFORM REGULATIONS FOR THE ADMISSION OF MIGRANTS TO THE DOMINIONS.

509. We turn to another subject of great importance to the future of migration. It is essential, in our judgment, that there should be co-ordinated action on the part of all the Oversea Governments who encourage migration from the Mother Country, in order to secure—

(*a*) uniformity in the regulations for the admission of British migrants, and

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* NOTE.—We call special attention to the replies received in Canada to our question concerning the prospects of the migration of State children (*see* pp. 199-200 of [Cd. 8458]). These replies were practically unanimous in stating that the demand was far in excess of the supply and that the results of emigration of this kind were excellent.

(*b*) the establishment of machinery by which a migrant from the United Kingdom can be assured before leaving home that he will not be rejected on arrival at a Dominion port, on medical or other grounds.

The attainment of the first of these objects will be one of the best methods possible of directing the stream of emigration to points within the Empire.

As to the second, we can hardly speak too strongly of the hardship which is involved when, after a home is broken up and its occupants have sailed for a distant land, one member is rejected on arrival, and has to return in bitter disappointment.

510. Evidence given before us by the Chief Medical Officer in London of the Commonwealth Medical Bureau* shows that Australia has already provided facilities for migrants of all classes to undergo an antecedent medical examination in the Mother Country at places convenient to their homes. The passing of such an examination will relieve them from anxiety as to admission on grounds of health. It seems to us that the precedent is an excellent one, and well worth adoption by the other Dominions. New Zealand has already gone so far as to provide such facilities in the case of applicants for assisted and nominated passages. We feel sure that, in any scheme of this kind, the self-governing Dominions could count on the co-operation of the National Insurance authorities in the United Kingdom, who, of course, have already local machinery which could be used.

511. As to uniformity in regulations for admission to the Dominions of migrants from the United Kingdom, there should be no inherent difficulty in obtaining it. Detailed discussion of the present regulations would be out of place in this Report, but the subject

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* Norris, p. 2 of [Cd. 7710].

should be one of the first to be discussed by the Consultative Board to the new Central Emigration Authority, and the recommendations made should form the basis for uniform legislation by the Dominion Governments.

UTILISATION OF EMPLOYMENT EXCHANGES IN THE UNITED KINGDOM FOR THE SUPPLY OF LABOUR TO THE DOMINIONS.

512. The question of the further utilisation of the Employment Exchanges in the United Kingdom in connection with migration has been brought before us by several witnesses. The subject is not a new one —it was discussed at the Imperial Conference of 1911, and correspondence has taken place since between the Governments concerned.*

Hitherto the work of these Exchanges in filling vacancies for employment in the self-governing Dominions has been confined to endeavouring to secure suitable candidates for vacancies which may be notified by firms in the Dominions or their agents in the United Kingdom, and the practice is to consult the representatives in London of the Dominion concerned before dealing with applications of this kind.

513. The correspondence to which we have referred shows that the Oversea Governments did not raise any objection to the present practice of the Employment Exchanges in dealing with requests received from, or on behalf of, employers in the Dominions, but they evinced little disposition to welcome any wider or more formal scheme of co-operation, and the evidence which we have received shows that similar views are widely held in the Dominions outside the official sphere, particularly by representatives of labour.

The objections may rest partly on the belief that the functions of Employment Exchanges are similar to those of Distress Committees, *i.e.*, that they mainly exist to find employment for the unemployable. This belief is, of course, quite unfounded.* We think, however, that there are more substantial reasons for the prevailing lack of enthusiasm for the further utilisation of the United Kingdom Employment Exchanges in filling vacancies in the Dominions.

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* Pp. 153–60 of [Cd. 5745], and pp. 190–2 of [Cd. 7351].

514. In the first place, most of the Dominions have at present no corresponding organisations, nor is the belief at all universal that a closely reticulated system, such as that in the United Kingdom, is suited to the requirements of the Dominions, with their vast spaces and limited population.

Secondly, difficulties may arise from the delay which must elapse before the prospective employee can reach his destination. Local conditions may have changed in the meantime, and opportunities may have occurred of obtaining suitable men on the spot.

Thirdly, if employers in the Dominions were to find that they could readily obtain the labour they needed by using the United Kingdom system to the neglect of local sources of supply, a feeling of resentment would certainly grow up.

515. On the whole we cannot recommend any extension of the present limited activities of the United Kingdom Employment Exchanges in supplying labour to the Dominions.

We suggest, however, that the machinery of the Exchanges could well be utilised in another, and novel, direction.

The Dominion and State Government Agencies are often engaged in giving special facilities in the way of assisted and nominated passages to persons selected or approved by themselves. We think that in many such cases they would find it of advantage to make use of the Employment Exchanges for inquiries as to the suitability of those whom they propose to help. The local knowledge of the Exchanges should render them of special assistance in any such inquiries.

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* Smith, Q. 210–11, p. 12 of [Cd. 7351].

EXCHANGE OF SCHOOL TEACHERS.

516. Of the many questions which have come before us during our journeys in the Dominions, few have impressed us more than the need for promoting there a closer knowledge of the conditions prevailing in the United Kingdom and correspondingly the need in the United Kingdom for a better acquaintance with conditions overseas.

Hence the special attention which we have devoted to the question of improvements in the system of collecting and disseminating Imperial news in Canada. Hence, too, the proposals which we shall make later on for reducing cable rates on press messages to the lowest possible figure.

517. From one point of view, of course, the war has proved an educative agency on an immense scale. It has spread knowledge of conditions in the Mother Country not only amongst the men of the oversea contingents, but also amongst those of the other sex who have crossed the seas to nurse or to be near them. It has also given to the people of the United Kingdom a far greater familiarity with conditions of life in the Dominions through their contact with the men of the oversea forces.

518. This educative influence, however, is, of course, temporary, whilst the need for it is permanent and urgent. In our judgment it is of vital importance that means should be found to continue similar work amongst the rising generation in each part of the Empire. We think a method which has much to commend it lies in the grant of greater facilities than those which have hitherto existed for the exchange of

school teachers between the Mother Country and each of the Dominions. The question has often been discussed, but so far no systematic attempt has been made to overcome difficulties. The subject is of such importance from the point of view of migration and its effects on Empire development that we think it desirable to conclude this Chapter of our Report with some suggestions for a practical scheme.

519. In our view the three essential questions which have to be faced in any scheme are these:—

(1) The certificates of elementary teachers in the self-governing Dominions should, in practice, be recognised *pro tanto* in the United Kingdom and *vice versâ*.

(2) The temporary absence of a teacher employed in a school in another part of the Empire should not be allowed to curtail that teacher's superannuation rights.

(3) Help should be given by the various Governments concerned to facilitate exchanges—
  (*a*) by providing a measure of financial support;
  (*b*) by finding suitable positions for the teachers engaged.

We will deal briefly with each of these points.

QUALIFICATIONS.

520. We found in the Dominions a general desire amongst the Governments to train their own teachers and to lay down for themselves the qualifications suited to meet their own special conditions. This desire is, of course, only natural and normal, and we see considerable difficulties in equating the various certificates issued by the Education Departments of the various parts of the Empire. The absence of identical certificates appears to us, however, no valid reason why each local Government should not take

steps to exchange a limited number of its own teachers temporarily (say, for a year) for teachers from other parts. Each Government could indicate in advance the qualifications required. It could surely rely on the other Governments selecting men or women possessing such qualifications.

SUPERANNUATION RATES.

521. We gather from the Board of Education in London that the question of superannuation allowances in the United Kingdom presents no serious obstacle to a system of interchange. The Elementary School Teachers' (Superannuation) Act, 1898, makes it possible for a teacher to be absent from service for six months without forfeiting any superannuation rights whatever. If his absence extended for a longer period, the only important effect would be that on his attaining the age of 65 his pension might be reduced 1*l*. a year for each year during which his absence continued. It is obvious that the effect, in the case of such short absences as we contemplate, would be inconsiderable.

We have no detailed information as to the corresponding position in the various Dominions, but the question would, no doubt, be treated by the Governments concerned in a liberal spirit.

GOVERNMENT ASSISTANCE.

522. The remaining difficulties of most importance are—

(*a*) that the rates of pay may differ;

(*b*) that in any case a shorter or longer period of time must be spent in travelling, during which no pay is being earned, and that steamship passages must be paid for;

(*c*) that in most cases elementary school teachers do not hold their posts directly under Government.

The first of these difficulties does not seem very great. Rates of pay must clearly be adjusted to the prevailing cost of living, and though they may differ in amount they probably do not differ greatly in purchasing value. In any case the difference in the rates of pay is unlikely to prove a serious deterrent to a teacher who is offered an opportunity of acquiring a year's new experience under novel conditions.

The second difficulty can be adjusted by fixed yearly contributions by Your Majesty's Government and the Oversea authorities to be spent on passages for teachers and in paying them during periods spent in travelling. It should be possible with proper organisation to find employment for some of the teachers on outward-bound emigrant ships, particularly to the Southern Dominions. This would lessen the expense.

The third difficulty again merely needs for its adjustment co-operation between Government Departments and the individual school authorities concerned. We are hopeful that the latter would readily help in a scheme of such Imperial importance.

523. We earnestly commend to the attention of Your Majesty's Government and the Oversea Governments the organisation of facilities for the temporary interchange of school teachers on the lines which we have suggested. We think that a vote, say, of 5,000*l*., by Your Majesty's Government, and smaller amounts by each of the Dominion, State, or Provincial Governments and by local authorities which desire to participate in such a scheme, would be more than repaid by the results achieved.

We have made detailed suggestions in regard to elementary school teachers, as these are concerned with the education of so much the largest proportion of children in all the self-governing parts of the Empire. We would add, however, that the arguments in favour of the interchange of elementary school teachers apply also in the case of teachers in secondary and other schools, and we strongly support the idea of interchange in these cases also.

CHAPTER IX.—OVERSEA COMMUNICATIONS.

524. The War has abundantly demonstrated that the life of the Empire depends upon its sea communications. Whatever the existing magnitude of the oceanborne commerce between the United Kingdom and the Dominions, and whatever the prospects of its development in the future, producer, manufacturer, and merchant alike are concerned, and vitally concerned, with securing cheap, regular and efficient transport for their goods, and, consequently, with the progressive improvement of the Empire's shipping facilities.

525. We emphasise this point, for we feel that, in discussions as to the best means of fostering trade within the Empire, its importance has been obscured by other factors affecting the exchange of merchandise, and in particular by the prominence given to fiscal legislation. In our view cheap sea transport is not only of importance in relation to other means of fostering exchange of merchandise, but it also confers absolute advantages on the countries which possess it. So long as freights are cheaper, and means of communication better, between the Mother Country and the Dominions overseas, and between the Dominions themselves, than between foreign countries and the Dominions, so long will trade naturally follow Imperial channels. If, therefore, it is possible to devise some means of permanent betterment of sea routes within the Empire, a powerful impulse will have been given to Imperial trade, while the strength and cohesion of the Empire will be notably increased.

HARBOURS.

526. The development of cheap, regular and efficient transport (and, indeed, of quick transport), depends in the last resort on increase in the size and draught of

ocean-going vessels, and, consequently, on the existence of harbours and waterways of a capacity and, particularly, of a depth, adequate to receive such vessels.

We dealt with the underlying causes at some length in our Second Interim Report,* and in our succeeding Reports we have emphasised the same point. It is one, however, of such outstanding importance that, as a preliminary to our detailed discussion of the subject generally, we may be permitted briefly to summarise the position.

Relation of Harbour Development to Economical Transport.

527. We quote from the remarkable memorandum furnished to us by Professor Sir J. H. Biles.†

> " The conclusion that unrestricted draught is necessary for economic transport can be arrived at from first principles. A vessel constructed of a depth sufficient to go to, say, 40 feet draught does not cost so very much more than a vessel or a depth constructed to go to 29 feet draught, whereas the increase in weight of cargo is the difference between the extreme draught of the vessel and the draught the vessel must have in order to float her hull, and machinery, and coal, and stores. Supposing two ships are constructed, the one of 29 feet draught and the other of 40 feet draught, and in each case the draught necessary to float hull, machinery, &c., *i.e.*, before paying cargo can be put in, is 23 feet. In the one case there is only 6 feet of draught available for paying cargo, whereas in the other case there is 17 feet. The weight of hull for the restricted draught vessel increases much more rapidly than the displacement. The beam cannot be increased in the same ratio as the length, or the stability conditions will be interfered with. Before a great length is reached the deadweight carried no longer increases as the length of vessel increases, but begins to decrease. Further, the excessive proportion of breadth to draught in the large vessel of restricted draught is bad from the point of view of resistance, and, therefore, those running costs which depend on the power of the machinery are considerably increased."

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* Pp. 19 ff. of [Cd. 7210].

† This memorandum was first published in [Cd. 7351] and, as revised, is reprinted in [Cd. 8460].

528. Following out this principle, Sir John Biles supplied various practical and very striking illustrations. He found that if draught were unrestricted the cost of transport steadily decreased with increase of length; thus a vessel 700 feet long, with proportionate draught, could transport goods on a 3,000 mile voyage at a speed of 14 knots 13 per cent. cheaper than a smaller vessel of 490 ft. in length, while increase of speed in the larger vessel would be much less costly. He also found that increase of length is uneconomical unless accompanied by adequate draught; thus, with draught restricted to 28 ft. 3 in., the cost of transport per ton for a voyage of 3,000 miles by a vessel 700 ft. in length would be 50 per cent. greater than if the same vessel had its full proportionate draught; in fact, increase of length without proportionate increase of draught not only does not diminish cost of transport, but actually increases it. His general conclusion is that both cheapness of transport and high speed are unobtainable except in vessels of great length and proportionate draught. Under present conditions such vessels are impracticable, as the harbours and waterways of the Empire will not admit them.*

Harbours and Waterways of the World.

529. To some extent these considerations have influenced the minds of shipowners, naval architects, and harbour authorities, but the improvement of isolated harbours is of little avail unless all the harbours on a given route are brought up approximately to the same level. Joint co-ordinated action is required. Individual disconnected improvement is of little use. It is, therefore, obvious that efforts should be made to correlate and develop the existing and future capacity

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* NOTE.—Improvements in hull and machinery may modify the figures given in the memorandum referred to. but the general character of the relation between economical transport and depth of harbours will remain

of harbours and waterways on the great trade routes of the Empire and to suggest a general scheme for improving the ports on those routes. We were unable to find that any other authority had instituted an investigation on these lines. The Board of Trade in the United Kingdom has certain functions in regard to harbours, but enquiries of this kind do not fall within its scope; the Admiralty no doubt possesses the information but has not hitherto applied it to mercantile conditions. We, accordingly, decided to undertake the investigation ourselves.

530. We are greatly indebted to Mr. F. Palmer, C.I.E., Consulting Engineer to the Port of London Authority, to Mr. A. G. Lyster, Consulting Engineer to the Mersey Docks and Harbour Board, and to Mr. Ormsby Jones, of the Harbour Department, Board of Trade, who assisted us in framing a schedule of questions intended to elicit, on a uniform scale throughout, the information required as a basis for practical recommendations.

531. The detailed results will be published in a separate volume, to which we call special attention, since it is, to the best of our knowledge, the first attempt of the kind.* It is important here to summarise the main conclusions.

I.—THE UNITED KINGDOM AND THE BRITISH EMPIRE.

532.—(*a*) Generally speaking the ports of the United Kingdom are by nature inferior to those of the Dominions when the depths at low water ordinary spring tide (L.W.O.S.T.) are compared, but the ports of the Mother Country have in most instances the natural advantage of greater range of tide. This results in a largely increased depth in the approach channels twice a day, viz., at high tide, and continuously in enclosed docks.

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* [Cd. 8461.]

(*b*) Generally speaking also, it appears that accommodation for deep-draught vessels can be provided at less cost at ports where there is a great range of tide and enclosed docks than at those where there are open wharves.

In both cases, however, ample provision is necessary for future development on a far-sighted scheme, in order to secure sufficient depth of water at the quays for the largest ships, which can be available irrespective of tides.

(*c*) Some of the harbour authorities of the United Kingdom are alive to the necessity for large schemes of development. In particular, the Port of London Authority and the Mersey Docks and Harbour Board have set themselves to make provision for the largest ships likely to be constructed for a considerable period of years, and Southampton has already accommodation at the quays for vessels nearly 40 feet in draught.

(*d*) For the most part, however, as will be seen from a study of the notes appended to the volume of statistics on harbours,[5] the harbour authorities of the United Kingdom represent, almost exclusively, local interests; they are more concerned, therefore, when they come to plan out a scheme of improvement, with securing somewhat better accommodation for present day ships than their neighbour along the coast or other competing port, than with providing for the ships of the future.

(*e*) So far as the Dominions are concerned, Canada is probably most favoured by nature with deep and extensive harbours, both on the East and West coasts.

Harbour depths in Australia are uneven (Brisbane in particular suffers in much the same way as the Port of London has suffered in the past, owing to the necessity for dredging and maintaining a long stretch of river before the quays are reached), but both Sydney and Hobart could accommodate at the quays vessels drawing 40 ft. Wellington and Auckland are but little inferior to Sydney in this respect. Melbourne, however, presents considerable difficulties for the accommodation of deep-draught vessels.

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[5] [Cd. 8461.]

(*f*) In the Dominions the control of the harbours is rarely left to local authorities, as it usually is in the United Kingdom. Thus, in Canada the Dominion Government is undertaking the new construction work which is going on at Halifax, St. John and Victoria, whilst it maintains an efficient measure of control over the harbours of Quebec, Montreal, and Vancouver, which are administered by Harbour Commissions. In Australia practically all the leading harbours are controlled, directly or indirectly, by the State Governments. In the Union of South Africa the ports were handed over to the control of the central Government by the terms of the Act of Union. In new Zealand the leading harbours are administered by Harbour Boards, but in each case one representative on the Board is appointed by the Governor in Council.

II.—FOREIGN COUNTRIES.

533.—(*a*) The ports of the mainland of Europe are, generally speaking, inferior in capacity and depth to the ports of the New World.

(*b*) The United States of America alone appear hitherto to have realised the necessity of deepening their harbours on a uniform scale. The most important United States harbours on the East coast and on the West coast, and the Panama Canal, are substantially uniform as regards depth.

(*c*) The correlated depth of the United States ports and of the Panama Canal may be attributed, partially at any rate, to the fact that the capacity of the Panama Canal was decided upon by the Federal Government, and that the United States Corps of Engineers has a considerable share in carrying out the dredging operations at the entrances to the various ports.

(*d*) The South American East coast ports are, generally speaking, shallow, and are relatively inferior as regards depth to the other ports of the Southern Hemisphere, viz., those of Australia, New Zealand, and South Africa. It should be noted, however, that considerable schemes of development are in hand in the Argentine, in Brazil, and in Uruguay. The authorities in the United Kingdom and the Dominions would do well to bear these schemes in mind.

Present want of Correlation and Possibilities of Improvement.

534. The memorandum from which we have already quoted* showed that the economic draught for vessels increased within certain limits by a fixed amount corresponding to increase in their length.

Thus, taking 28 ft. 3 in. as the economic draught for a vessel 490 ft. in length, it was found that this draught increased to 30 ft. for a vessel 520 ft. in length, to 33 ft. for one 573 ft. in length, to 34 for one 590 ft. in length, and to 38 ft. for one 660 ft. in length, and so on. We do not think it expedient to extend our inquiry beyond the limit of 38 ft. draught, as it does not appear possible to obtain, for the present, general provision for any greater draught on the principal Imperial routes. We propose, however, to examine these routes from the point of view of their present and potential capacity to receive vessels of the various dimensions mentioned.†

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* *See* [Cd. 8460].

† In the Tables which follow we have taken the figures as supplied by the Harbour Authorities concerned up to the date of signature of this Report.

535. To accommodate such vessels it is necessary that the requisite depth should be provided:—

(*a*) In the approach channels at high water ordinary neap tide (H.W.O.N.T.).

(*b*) In entrance locks and enclosed docks at H.W.O.N.T. and at open quays at L.W.O.S.T.

Vessels will then be able to lie in the ports fully loaded at any state of the tide, and to enter and leave without hindrance at least twice every 24 hours, except at extraordinary tides.

ROUTE VIÂ THE SUEZ CANAL TO THE EAST AND AUSTRALIA.

536. The following table gives the depths already available, or now being made available, at the most important ports in the United Kingdom, in the Suez Canal, and at Aden:—

Name of Port.	Minimum Available Depth in Approach Channel H.W.O.N.T.	Maximum Depth now available at Enclosed Docks at H.W.O.N.T. (*a*), or at Open Quays at L.W.O.S.T. (*b*).	Maximum Depth to be available at Enclosed Docks at H.W.O.N.T. (*a*), or at Open Quays at L.W.O.S.T. (*b*), when Works, now under construction, are completed.
	Ft. Ins.	Ft. Ins.	Ft. Ins.
London (Tilbury)	42 6	33 6 (*a*)	—
London (Royal Albert Docks).	39 11	32 8 (*a*)	38 0 (*a*)
Liverpool (Gladstone Dock).	49 7	39 1 (*a*)	—
Liverpool (Prince's Landing Stage).	49 7	36 0 (*b*)	—
Southampton ...	44 6	40 0 (*b*)	—
Glasgow	33 0	28 0 (*b*)	—
Humber (Hull) ...	45 0	33 0 (*a*)	—
Humber (Immingham).	45 0	31 6 (*a*)*	—
Bristol	38 0	33 0 (*a*)	—
Cardiff	32 0	32 0 (*a*)	—
Suez Canal ...	(Maximum draught now permissible, 30 ft.)		
Aden	34 6	30 0 (*a*)†	—

In dock. † In basin.

537. After Aden, the routes to the East and to Australia must be considered separately. The figures of depth, corresponding to those above, are as follows:—

Name of Port.	Minimum Available Depth in Approach Channel H.W.O.N.T.	Maximum Depth now available at Enclosed Docks at H.W.O.N.T. (*a*), or at Open Quays at L.W.O.S.T. (*b*).	Maximum Depth to be available at Enclosed Docks at H.W.O.N.T. (*a*), or at Open Quays at L.W.O.S.T. (*b*), when Works, now under construction, are completed.
	Ft. Ins.	Ft. Ins.	Ft. Ins.
	(*a*) To	THE EAST.	
Bombay	32 3	34 3 (*a*)	—
Colombo	32 0	33 0*	36 0*
Calcutta	28 0 (approx.)	29 0 (*a*)	40 0(*a*)
Singapore ...	48 0	33 0 (*b*)	40 0(*b*)
Hong Kong ...	42 0	40 0†	—
	(*b*) To	AUSTRALIA.	
Colombo	32 0	33 0*	36 0*
Fremantle ...	32 0	30 0 (*b*)	—
Adelaide	36 0	35 0 (*b*)	—
Melbourne ...	41 6‡	30 0 (*b*)	37 0(*b*)
Sydney	44 6	35 0 (*b*)	49 0(*b*)
Hobart	39 6	40 0 (*b*)	—
Brisbane	31 3	28 0 (*b*)	—

* At anchorage. † At moorings.
‡ From which 8–10 ft. must be allowed for "scend."

538. It is clear that the governing depth on these routes is, and will continue to be, that permissible in the Suez Canal. The Canal, as the figures above show, now admits vessels up to 30 ft. draught.* Its present programme (due for completion in 1920) provides for an increase in draught up to 33 ft.

The question then is,—do the ports on the routes conform to the existing depth of the Canal, and will they, by 1920, be able to provide for vessels of the greater draught contemplated?

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* More than two feet of water is, in fact, required under keel.

539. It will be seen from the tables above that all the United Kingdom ports except Glasgow, and all those east of the Suez Canal except Calcutta and Brisbane, have a sufficient depth of water to accommodate vessels of 30 ft. draught, both in the channel and at the quays or docks.

Glasgow has already accommodation in the channel, and a depth of 30 ft. L.W.O.S.T. at the quays is contemplated. Owing to difficulties in the navigation of the River Hooghly, Calcutta seems limited for a considerable time to vessels drawing 29 ft. at most. Brisbane, it is contended, is a terminal port, and whilst the depth in the channel already exceeds 30 ft. at H.W.O.N.T., the harbour is mainly used by vessels only partly loaded.

540. As to the future, several of the United Kingdom ports can already accommodate vessels with a draught of 33 ft.

The time required at Aden to accommodate such vessels would probably be two years and the cost 50,000*l*.

At Bombay further deepening would be required just outside the present dock channel. This would cost probably 20,000*l*.

Colombo, Singapore, and Hong Kong either have already, or will have when works now in progress are completed, sufficient depth of water to receive ships of 33 ft. draught.

In Australia, provision is already made at Adelaide, Sydney, and Hobart.

At Fremantle the intention is to deepen the entrance channel and harbour to a depth of 36 ft. below lowest low water. This can be done in two years at a cost of approximately 400,000*l*.

At Melbourne vessels drawing 33 ft. will be able to enter and leave as soon as the depth at Port Phillip Heads is increased to 43 ft. H.W.O.N.T.* To secure this depth at the present rate of progress might take three years and cost some 15,000*l*. Deepening in the channel to Port Melbourne must be contingent on the progress of operations at the Heads.

541. To sum up, the ports on the routes *viâ* the Suez Canal requiring attention, if they are to be adequately deepened in time for the completion of the present Suez Canal programme, are Aden, Bombay, Fremantle, and Melbourne, more particularly the two latter.

ROUTE FROM THE UNITED KINGDOM TO EASTERN CANADA.

542. The following table shows the depths already available, or now being made available, on the route from the United Kingdom to Canada :—

Name of Port.	Minimum Available Depth in Approach Channel H.W.O.N.T.	Maximum Depth now available at Enclosed Docks at H.W.O.N.T. (*a*), or at Open Quays at L.W.O.S.T. (*b*).	Maximum Depth to be available at Enclosed Docks at H.W O.N.T. (*a*), or at Open Quays at L.W.O.S.T. (*b*), when Works, now under construction, are completed.
	Ft. Ins.	Ft. Ins.	Ft. Ins.
London (Tilbury)	42 6	33 6 (*a*)	—
London (Royal Albert Dock).	39 11	32 8 (*a*)	38 0(*a*)
Liverpool (Gladstone Dock).	49 7	39 1 (*a*)	—
Liverpool (Prince's Landing Stage),	49 7	36 0 (*b*)	—
Southampton ...	44 6	40 0 (*b*)	—
Halifax	40 6	45 0 (*b*)	—
St. John, N.B. ...	53 6	32 0 (*b*)	—
Quebec	43 6	40 0 (*b*)	—
Montreal	30 0	35 0 (*b*)	—

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* *See* note to table on p. 271. The extra depth is necessary on account of "scend."

543. This route is subject to no such limitations as those caused by the Suez Canal. We, therefore, propose to consider it from the point of view of its ability to take ships of 38 ft. draught.

544. Two ports in the United Kingdom, viz., Liverpool and Southampton, and two in Canada, viz., Halifax and Quebec, already provide sufficient depth of water both in the approach channels and at quays or docks.

Liverpool, however, would be at present unable to accommodate such vessels at the Prince's Landing Stage at L.W.O.S.T., but only at the enclosed Gladstone Dock at H.W.O.N.T.

As to London, the present extensions at the Royal Albert Dock provide for a depth of 41 ft. 8 ins. at the entrance lock, but only for 38 ft. inside the dock itself, which would have to be increased in order to give sufficient margin for a vessel of the same draught when fully loaded.*

The channel between Tilbury and the Albert Dock, which at present gives a depth of 39 ft. 11 ins. at H.W.O.N.T., is being dredged to give a depth of 47 ft. 11 ins. at H.W.O.N.T.

At St. John, N.B., the new construction works at Courtenay Bay do not provide for a greater depth at the quays than 32 ft. L.W.O.S.T.

As regards Montreal, the St. Lawrence ship channel between that port and Quebec is at present only 30 ft. and is likely to be limited for several years to come to a depth not exceeding 35 ft.

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* As regards Tilbury, where the outer sill of the entrance lock is 6 ft. lower than the inner sill, we understand that an additional 6 ft. of depth could, if necessary, be provided by pumping. This would give a depth of 39 ft. 6 ins. in all in the dock.

545. To sum up, if the depth available at the Prince's Landing Stage, Liverpool, were further increased, the main obstacle to the passage of vessels drawing 38 ft. between leading ports in the United Kingdom and Canada would be removed. It would be most desirable, however, for London also to make immediate provision for vessels of this draught by providing sufficient depth in the Royal Albert Dock extensions.

ROUTE BETWEEN WESTERN CANADA, NEW ZEALAND, AND AUSTRALIA.

546. The following table shows the depths already available, or now being made available, in the approach channels, and at quays or docks, of the chief ports which are or might be utilized on the route between Western Canada, New Zealand and Australia.

Name of Port.	Minimum Available Depth in Approach Channel H.W.O.N.T.	Maximum Depth now available at Enclosed Docks at H.W.O.N.T. (*a*), or at Open Quays at L.W.O.S.T. (*b*).	Maximum Depth to be available at Enclosed Docks at H.W.O.N.T. (*a*), or at Open Quays at L.W.O.S.T. (*b*), when Works, now under construction, are completed.
	Ft. Ins.	Ft. Ins.	Ft. Ins.
Vancouver ...	43 3	35 0 (*b*)	—
Prince Rupert ...	74 0	30 0 (*b*)	—
Victoria	36 0	30 0 (*b*)	35 0 (*b*)
Honolulu	34 0	32 0 (*b*)	37 0 (*b*)
Fiji	38 3	32 0 (*b*)*	32 0 (*b*)†
Auckland	40 0	35 0 (*b*)	—
Sydney	44 6	35 0 (*b*)	40 0 (*b*)

* For a length of 295 feet only.

† At a wharf 1,500 feet in length.

547. On this route all the approach channels (except possibly that at Victoria and that at Honolulu, which is being deepened) could accommodate vessels of 36 ft. draught at least. At Vancouver, however, the depth at the quays is limited to 35 ft. at low water at present, and the same depth is being provided at the two new wharves now being constructed at Victoria. The Department of Public Works of Canada informed us that this depth was considered sufficient, and that no estimates for further deepening had yet been made. Now a depth of 35 ft. at the quays should allow sufficient margin for the accommodation of a vessel of 34 ft. draught fully loaded. We proceed then to consider the position of other ports on this route as regards provision for such vessels.

At Prince Rupert the harbour is extremely deep and provision could be made for a vessel of this draught at the quays at an expense of not more than 10,000*l*.

At Honolulu, as the table shows, a pier is under construction having a depth alongside of 37 ft. at low water.

At Fiji the present programme provides for a depth of 32 ft. L.W.O.S.T. at the quays, and, as it is an intermediate port, it is not certain that this depth need be increased. The further deepening could, however be provided if necessary in about one year at a cost of approximately, 10,000*l*.

At Auckland and Sydney accommodation is already available.

548. To sum up, in order to provide for vessels of 34 ft. draught on this route only a slight deepening might be necessary at Fiji, though the depth of water at Prince Rupert quays would also need to be increased if it were chosen as one of the ports for through traffic.

ROUTE FROM THE UNITED KINGDOM TO AUSTRALIA AND NEW ZEALAND VIÂ THE UNION OF SOUTH AFRICA.

549. The following table shows the depths already, or now being made, available in the approach channels and the quays or docks at the principal ports on the route from the United Kingdom to Australia and New Zealand viâ the Union of South Africa.

Name of Port.	Minimum Available Depth in Approach Channel H.W.O.N.T.	Maximum Depth now available at Enclosed Docks at H.W.O.N.T. (*a*), or at Open Quays at L.W.O.S.T. (*b*).	Maximum Depth to be available at Enclosed Docks at H.W.O.N.T. (*a*), or at Open Quays at L.W.O.S.T. (*b*), when Works, now under construction, are completed.
	Ft. Ins.	Ft. Ins.	Ft. Ins.
London (Tilbury)	42 6	33 6 (*a*)	—
London (Royal Albert Docks).	39 11	32 8 (*a*)	38 0 (*a*)
Liverpool (Gladstone Dock).	49 7	39 1 (*a*)	—
Liverpool (Prince's Landing Stage).	49 7	36 0 (*b*)	—
Southampton ...	44 6	40 0 (*b*)	—
Capetown ...	39 2	36 0 (*b*)	—
Durban	34 6	38 6 (*b*)	—
Fremantle ...	32 0	30 0 (*b*)	—
Adelaide	36 0	35 0 (*b*)	—
Melbourne ...	41 6*	30 0 (*b*)	37 0 (*b*)
Sydney	44 6	35 0 (*b*)	40 0 (*b*)
Hobart	39 6	40 0 (*b*)	—
Dunedin (Port Chalmers).	31 4	28 0 (*b*)	32 0 (*b*)
Lyttelton	33 0	32 0 (*b*)	—
Wellington ...	42 0	36 0 (*b*)	—
Auckland	40 0	35 0 (*b*)	—

* Of which 8–10 feet must be allowed for "scend."

550. This route is already largely used by through traffic from the United Kingdom to Australia and New Zealand. It is a deep-water route throughout. We, therefore, propose to consider it from the point of view of its possibilities for vessels of 38 ft. draught.

551. As regards the three United Kingdom ports, the approach channels present no difficulty. Vessels of 38 ft. draught could be accommodated both at the Southampton quays and at the Gladstone Dock at Liverpool.

The Prince's Landing Stage at Liverpool would, however, as we have already shown (para. 545 above), require deepening, and it would also be necessary to undertake further deepening inside the Royal Albert Dock extensions in London to provide accommodation for such vessels.*

At Capetown a new programme approved by the Union Government includes a basin containing several berths with a depth of 40 ft. L.W.O.S.T. The whole scheme, of which this new basin is a part, is estimated to cost 3,000,000*l*.

At Durban accommodation could be provided in the channel and at berths for ships of 38 ft. draught in three years at a cost of 50,000*l*.

At Fremantle, it is stated, there is no inherent difficulty in providing for ships of this draught, but no complete estimates have been taken out. At Adelaide an entrance channel and four berths of the requisite depth could be provided at a cost of about 1,000,000*l*.

It is stated that to obtain a depth of 47 ft. H.W.O.N.T. at Port Phillip Heads† will take 12 years and cost 70,000*l*. The slow progress anticipated is due to the fact that operations can only be carried on in fine weather and at slack water, and then only for a very short period at a time.

Plans have been got out for deepening the channel from the Heads to Port Phillip Bay to 40 ft. H.W.O.N.T. in three years at a cost not exceeding

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* As regards Tilbury, *see* note on p. 274.

† Which would be needed for vessels of 38 ft. draught on account of "scend."

100,000*l*.; and the only other work needed to make Port Melbourne accessible to vessels drawing 38 ft. would be certain dredging in the approach channels and at the new railway pier. This would certainly be accomplished by the time the other works were completed at a cost not exceeding 150,000*l*.

At Hobart and Sydney works already completed or in progress secure ample provision for vessels of 38 ft. draught.

As regards New Zealand, Dunedin (Port Chalmers) could have its approach channel and quays deepened to receive such vessels in 5 years at a cost of 250,000*l*. At Lyttelton the time would be 4½ years and the cost 200,000*l*. At Wellington and Auckland only deepening at the quays would be necessary. This could be done at a cost of 6,000*l*. in the case of Wellington and 20,000*l*. in that of Auckland, and the time in each case would be not more than two years.

552. To sum up, further development is required—

(*a*) both at Liverpool and London in the United Kingdom,
(*b*) at Capetown and Durban in South Africa,
(*c*) at Fremantle, Adelaide and Melbourne in Australia,
(*d*) at each of the four New Zealand ports mentioned,

to provide accommodation for vessels of 38 ft. draught, but only in the case of Melbourne and possibly Fremantle does there seem any serious difficulty in obtaining this accommodation within, say, the next five years.

ROUTE FROM THE UNITED KINGDOM TO NEW ZEALAND AND AUSTRALIA VIA EASTERN CANADA, JAMAICA, THE PANAMA CANAL AND TAHITI.

553. The following table shows the depths already available, or being made available, in the approach channels and the quays or docks on the various ports

on the Panama route, and also in the Panama Canal itself.

Name of Port.	Minimum available Depth in Approach Channel H.W.O.N.T.	Maximum Depth now available at Enclosed Docks at H.W.O.N.T. (*a*), or at Open Quays at L.W.O.S.T. (*b*).	Maximum Depth to be available at Enclosed Docks at H.W.O.N.T. (*a*), or at Open Quays at L.W.O.S.T. (*b*) when Works now under construction are completed.
	Ft. Ins.	Ft. Ins.	Ft. Ins.
London (Tilbury).	42 6	33 6 (*a*)	—
London (Royal Albert Dock)	39 11	32 8 (*a*)	38 0 (*a*)
Liverpool (Gladstone Dock)	49 7	39 1 (*a*)	—
Liverpool (Prince's Landing Stage)	49 7	36 0 (*b*)	—
Southampton ...	44 6	40 0 (*b*)	—
Halifax	40 6	45 0 (*b*)	—
Kingston (Jamaica)	36 6	24 0 (*b*)†	—
Panama Canal (Cristobal)	41 0	40 0 (*b*)	—
Panama (Balboa)	47 6	39 0 (*b*)	—
Tahiti	43 0	66 0 *	43 0 (*b*)
Auckland ...	40 0	35 0 (*b*)	—
Sydney	44 6	35 0 (*b*)	40 0 (*b*)

* At anchorage.

† Vessels drawing up to 32 ft. have lain at anchorage.

554. As a least depth of 40 ft. is to be maintained in the locks and throughout the Panama Canal, we propose to consider this route also from the point of view of its capacity to accommodate vessels drawing 38 ft.

With the measures needed or in progress at the home ports (paras. 544-5), Halifax (para. 544), Auckland (para. 551), and Sydney (para. 551), we have already dealt.

The Panama Canal, as the figures show, is able to receive vessels drawing 38 ft., and the same remark applies to Tahiti, where they can already lie at the anchorage and will be able to lie at the wharves when the operations now in progress are completed.

It remains to consider the position of Jamaica. Here, the time needed to dredge the channel in order to receive such vessels is estimated at two years, but no figures are available as to cost. The cost of providing wharf accommodation is estimated at 60,000*l*. and the time at 18 months.

555. To sum up, in order to provide accommodation on this route for vessels of 38 ft. draught, action is needed in the case of Liverpool, London, Kingston (Jamaica), and Auckland, and the port at present requiring most attention is probably Kingston.

DRY-DOCK ACCOMMODATION.

556. The question of dry-dock accommodation is best treated separately, and with reference to the position in the Empire generally.

The following table shows the dimensions of the principal dry-docks:—

Name of Port.	Length.		Breadth		Depth over Sills H.W.O.N.T.	
United Kingdom :	Ft.	ins.	Ft.	ins.	Ft.	ins.
London (Tilbury)	700	0	70	0	30	6
London* (Royal Albert Dock) ...	575	0	80	0	24	11½
Liverpool (Gladstone Dock) ...	1,050	0	120	0	39	1
Liverpool (Canada Graving Dock)	925	6	94	0	27	0
Southampton	897	0	100	0	31	6
Glasgow	880	0	83	0	25	0
Belfast	886	7	96	0	34	4
Bristol	875	0	100	0	32	0
Hull (Immingham)	740	0	56	0	22	0
Tyne	704	8	89	6	25	9
Canada :						
Halifax	588	0	89	3	28	6
Montreal†	600	0	100	0	32	0‡
Quebec	600	0	62	0	20	6
Prince Rupert†	600	0	100	0	28	0‡
Australia :						
Sydney	700	0	83	0	27	0
Brisbane	431	6	56	0	16	9

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* A new dry-dock is under construction at the Royal Albert Dock extension having the following dimensions: Length 750 ft. Breadth 100 ft. Depth on sill, 36 ft.

† Floating dock. ‡ Over keel blocks.

Name of Port.	Length.		Breadth.		Depth over Sills H.W.O.N.T	
	Ft.	ins.	Ft.	ins.	Ft.	ins.
New Zealand :						
Auckland	521	0	65	7½	31	6
Lyttelton	481	6	62	6	22	0
Dunedin	500	0	70	0	21	0
Union of South Africa :						
Capetown	529	0	65	9	24	2
Durban*	475	0	70	0	23	0†
Newfoundland :						
St. John's	610	0	84	9	25	0
India :						
Bombay	1,000	0	100	0	33	3
Calcutta	511	0	67	0	24	0
Eastern Colonies :						
Colombo	711	0	85	0	30	8
Singapore	873	0	93	0	30	9
Hong Kong	787	0	88	0	31	6

* Floating dock. † Over keel blocks.

557. It will be seen from the above table that whilst the United Kingdom is well supplied with dry-docks to take ships up to 660 ft. in length and of corresponding draught, and whilst the same may be said of the route to the East viâ the Suez Canal, the case is different with the self-governing Dominions. In Canada, South Africa and New Zealand there are no commercial dry-docks capable at present of receiving vessels more than 600 feet in length, and in Australia there is only one—namely, at Sydney. We should mention, however, that in Eastern Canada there are dry-docks of the following dimensions under construction or in contemplation.

Name of Port.	Length.	Breadth.	Depth over sills H.W O.N.T.
	Ft.	Ft.	Ft.
Quebec	1,150	120	34
Halifax	1,150	120	39

A first class dry-dock is also in contemplation at St. John, N.B.

In South Africa the Admiralty graving dock at Simonstown can be used in emergency by merchant vessels. The dimensions of this dock are:—

Length.	Breadth.	Depth over sills H.W.O.N.T.
Ft ins.	Ft. Ins.	Ft. Ins.
756 4	95 1	34 5

Also the construction of a graving dock of the following dimensions has been planned at Durban:—

Length.	Breadth.	Depth over sills H.W.O.N.T.
Ft.	Ft.	Ft. Ins.
1,030	110	38 6

CONCLUSION.

558. Summing up the position as a whole, we are of opinion that certain ports on the various trade routes with which we have dealt, can, and should, be deepened and enlarged so that accommodation may be provided throughout these routes for vessels of the following draughts:—

(*a*) 33 ft. on the route from the United Kingdom *viâ* the Suez Canal to the East and Australia.

(*b*) 34 ft. on the route from Western Canada to New Zealand and Australia.

(*c*) 38 ft. on the routes from the United Kingdom—

(1) To Eastern Canada;

(2) To Australia and New Zealand *viâ* the Union of South Africa;

(3) To New Zealand and Australia *viâ* Halifax, Jamaica, and the Panama Canal.

We are of opinion also that action should be taken, where necessary, to secure dry-dock accommodation in the self-governing Dominions for vessels of these draughts, and of the corresponding economic lengths.

559. We wish to make it clear that the figures given above as to the cost of increased depth in the approach channels and at the docks and quays are on the basis of estimates obtained before the outbreak of war Even if allowance is made, however, for the present enhanced cost of materials and labour, the cost of carrying out the improvements suggested would not exceed that of building a few hundred miles of railway, whilst the benefit to the Empire would be incommensurably greater.

Recommendations.

560. Hitherto, as we have shown, the harbour engineer and the naval architect have each pursued a solitary path and there has been little correlated effort.

Thus engineers, in designing new harbour works, have had to depend upon such information as could be obtained from shipowners, and upon their own judgment, based on the growing dimensions of ships, which, indeed, have steadily exceeded current expectation. Naval architects, on the other hand, have contented themselves with urging the provision of harbour accommodation for larger and still larger vessels Now, however, that the maximum dimensions which can be profitably utilized in ship construction have been indicated in the Memorandum quoted, harbour engineers, whilst building in future to accommodate vessels of the sizes indicated, should not find it necessary to build beyond those sizes. In other words, whilst expenditure may be increased in one direction, viz., in the provision of increased depth, it will probably be saved in other directions.

561. Even if, however, the individual improvements which we have outlined in the previous paragraphs are successfully initiated and carried out, it is probable that, unless further action is taken, uniform progress will not be made.

562. We, therefore, put forward the following recommendations of principle:—

(1) It is, in our view, essential that, in future, all schemes of improvement for certain ports on the great trade routes should be submitted to the Imperial Development Board, whose creation we advocate elsewhere in this Report, so that the Board may advise, in the light of the best expert opinion obtainable, whether these schemes provide for the future reception of vessels of the length and draught required for the cheap and speedy transport of the Empire's merchandise.

In order to prevent subsequent undesirable discussion, it would be advisable for the Governments concerned to prepare at once, in collaboration, a schedule of the ports to which this principle is to apply.

We do not, in any way, suggest that the Imperial Development Board should advise on, still less that it should interfere with, details of construction, equipment, &c. These are clearly matters for local consideration and settlement.

Our sole object is to secure that Imperial as well as local requirements may be jointly considered in the future.

(2) It must be recognised that the enlargement and deepening of harbours on the scale commensurate with Imperial requirements may involve expenditure in excess of that

which purely local requirements would demand.* In such cases it would rest with the Government concerned to assist in providing the necessary additional capital and interest charges.†

(3) An Imperial representative, or representatives, should be added to the governing bodies of those harbours in the United Kingdom which are included in the schedule referred to above. A similar practice, as we have already shown, obtains in New Zealand, and there is also some precedent for this in the presence of Imperial representatives on the governing bodies of the ports of London, Liverpool, and Southampton, but the powers of such representatives should be largely extended, and care should be taken not to appoint persons whose experience is limited to local conditions.‡ If possible, the same person or persons should be appointed as the Imperial representatives on all these governing bodies, as this practice would tend to secure greater uniformity.

(4) Similar action to that outlined in the above recommendations should be taken in regard to the construction of new dry-docks in the United Kingdom, and, where necessary, in other parts of the Empire. It would also

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* This aspect of the matter is fully set out in the valuable Memorandum furnished to us by Mr. A. G. Lyster, Consulting Engineer to the Mersey Docks and Harbour Board. *See* [Cd. 8460].

† This point is of importance where the administration of harbours is in the hands of local authorities, or only supervised by the Government without full financial control.

‡ In a Memorandum furnished to us by the Board of Trade it is stated that the present practice of the Board is to appoint a local man of suitable experience as their representative on the governing bodies of harbours in the United Kingdom. *See* [Cd. 8460].

> be most desirable that the Governments concerned should consider the question of constructing new dry-docks, at selected centres, of such dimensions as will accommodate warships as well as the largest commercial vessels.

563. We hold it to be of the utmost importance that the recommendations which we have made above should be carried into effect. We look upon the scientific development of the harbours of the Empire as the underlying factor in the whole problem of its oversea communications.

SHIPPING COMMUNICATIONS.

564. We have emphasised the necessity for deep harbours and waterways as the primary requisite if goods are to be carried cheaply from one part of the Empire to another, but it must not be forgotten that such harbours and waterways are as essential for the development of speed as for economy in transport.

The memorandum from which we have already quoted, brings out this point most clearly. It is economically impossible to drive vessels of small length and draught at a high speed, say over 18 knots, unless a large additional passenger revenue may be expected on account of increased speed, or unless the Governments concerned are prepared to spend very large sums in increased subsidy. High speed can only be obtained at reasonable cost from larger and longer vessels, and these vessels are only economically possible if, in addition to great length, they have corresponding draught.

565. Now all parts of the Empire, and particularly the self-governing Dominions, are deeply interested in the improvement of their oversea communications. Canada aims to achieve a mail service equivalent to

that on the route between the United Kingdom and New York.* We showed in our Third and Fourth Interim Reports that there is a considerable feeling both in South Africa and in Newfoundland against the present relatively slow speed of the mail services.† Most of all in Australia and New Zealand there is a strong desire for improved communication with the Mother Country in view of the great distances involved.

In each case the problem as yet unsolved is how best to meet this demand at a reasonable cost. It is one which calls for the closest attention both from the local and the Imperial standpoint.

566. Our own view is that the matter of mail communications is essentially one where the Governments of the Empire should unite. That is to say, they should, in concert, deepen selected harbours on the various trade routes to accommodate vessels of adequate length and draught for high speed at an economical rate. They should concurrently encourage the building of the necessary number of vessels of these dimensions. This would secure for the Empire a number of vessels not only of high speed, but of a high steaming radius, which, as experience has shown, is of inestimable advantage in time of war. In practice, the main use of vessels of this kind will be for developing the mail communications with Australia and New Zealand; Canada and the Union of South Africa are each interested in one or more of the alternative routes to the Commonwealth and the Dominion.

Mail Communication with Australia and New Zealand.

567. In our Second Interim Report we put forward tentative suggestions on the question of mail communication with Australia and New Zealand, having

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* Campbell, Q. 741, p. 30, of [Cd. 7971]. De Sola, Q. 3280, p. 238 of [Cd. 8458].

† P. 44 of [Cd. 7505] and 13 of [Cd. 7711].

in mind the approaching termination of the contract with the Peninsular and Oriental Steam Navigation Company for the conveyance of these mails *viâ* the Suez Canal.

Our suggestions were criticised by Your Majesty's then Postmaster-General in a letter which was forwarded to us and which we propose to include amongst the papers to be published relating to the work of the Commission.* Since his criticisms have an important bearing on the policy to be adopted in the future, we think it well to summarise and comment on them as a preliminary to restating our final conclusions on the subject.

568. In principle the views expressed by the Postmaster-General were as follows:—

(1) No alternative routes to Australia and New Zealand can afford a time of transit for the mails at all comparable to that provided under the present arrangements.

(2) There is no sufficient ground, either financial or political, for making any change of route which would involve a slower period of transit than that *viâ* France, Italy, and Suez.

(3) A mail subsidy is a payment for regularity of service, and for the actual conveyance of the mails which require special handling, and for which space must always be reserved.

(4) Subsidies are now so small an item in the budget of the ships employed that there is little or no prospect of a successful mail service by a route or at a speed different from the routes and speeds suitable for ordinary commerce.

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* *See* [Cd. 8460].

(5) Mail contracts should contain provisions relating only to postal facilities, any other requirements being the subject of separate agreements where necessary.

569. We comment on these views in order.

(1) In the case of New Zealand we cannot agree that there is no alternative route which would provide a shorter means of transit for the mails. In point of distance the route from the United Kingdom to Auckland *viâ* Panama is 560 nautical miles shorter than that to the Bluff *viâ* Brindisi, Suez, and Melbourne.* Again, the route from New Zealand *viâ* Cape Horn and that to and from the Dominion *viâ* Eastern Canada and Vancouver are only slightly longer than the route *viâ* Brindisi and the Suez Canal.*

In point of time it is already perfectly easy to travel to Auckland by the trans-Canada route in a period several days shorter than that allowed for the mails *viâ* Brindisi.

In the case of Australia it must be admitted that the alternative routes are longer in distance than that viâ France, Italy and Suez. But in point of time it is by no means certain that as fast a transit is not possible on more than one of the alternative routes, which afford facilities for larger vessels and consequently for a higher speed. Moreover there is already a monthly trans-Pacific service *viâ* San Francisco which in normal times takes the mails between the United Kingdom and Sydney in 30 days. This time is as short as that required for their conveyance to Sydney *viâ* Brindisi, Suez and Melbourne.

(2) We think that if the letter which we have summarised had been written in 1916 instead of in 1914

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* The actual distances are given in detail on pp 27-8 of [Cd. 7210.]

occasion would have been found to modify the view that there is no sufficient ground for making any change of route. One of the principal lessons of the present war has been to emphasise the value to the British Empire of other routes to Australia and New Zealand, particularly those *viâ* the Cape of Good Hope and Canada, as alternatives to that *viâ* the Mediterranean. Indeed the vessels of one of the subsidised companies have for some time past been sent by the Cape route.

(3) Payment for mails from the United Kingdom which are carried by steamers not running under mail contracts, and consequently not bound to depart or arrive at any given time, is made at the rate of ½*d.* per article of correspondence, and our point was, and is, that this in itself is sufficient remuneration to secure regularity of sailing, careful handling, and a proper allocation of space. The Postmaster-General admits that this rate is equivalent to about 28*l.* per ton for letters, postcards, printed papers, commercial papers, &c. For letters and postcards alone the amount is, as we pointed out,* 224*l.* per ton. In any case the amount available at the statutory rate of ½*d.* per article would work out at, roughly, 1,000*l.* for each outward weekly trip from the United Kingdom to Australia and New Zealand. Even in these days of abnormal freights this amount seems to us extraordinarily high in proportion to the services rendered. We may add that if the normal time-tables of unsubsidised vessels on the Australian and New Zealand service are examined it will be found that they maintain a regularity of service at all times of the year not greatly differing from that of the subsidised vessels.

(4) If it is true that subsidies are so small an item in the budget of the ships employed that there is little or no prospect of successful mail services by a route or

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* P. 25 of [Cd. 7210]

at a speed different from the routes and speeds suitable for ordinary commerce, then the present speed of the subsidised vessels on the Suez route cannot be accounted for by the subsidy. What then is the justification of the subsidy? In our view, as stated above, the amount which would be paid at statutory rates for the conveyance of the mails is ample to secure regularity, careful handling, and sufficient space.

(5) It has long been the stated policy of Your Majesty's Government that mail contracts should not contain clauses other than those regarding postal facilities, but we regard this as an affectation of purism, and we think it by no means proven that this policy should stand. As we stated in the Report already quoted,* "There are matters of importance "such as through rates for exports, equality of treat-"ment for national as compared with foreign goods, "the training of seamen, and the adaptability of ships "to war conditions, which form in some other coun-"tries the object of stipulations favourable to the "public interest." We venture to think that the experience of the present war amply confirms this view. Postal convenience should by no means be the only consideration. The whole experience of the Dominion Governments runs counter to the theory put forward by the Postmaster-General. In the contract made by the Postmaster-General of the Commonwealth of Australia with the Orient Steamship Company in 1907 special stipulations were inserted with regard to the rates of carriage of certain goods; in the case of the Union of South Africa, as we remarked in our Third Interim Report,† "important servitudes are "imposed and definite engagements favourable to "trade development are undertaken" under the agreements between the Union Government and the

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* P. 25 of [Cd. 7210].

† P. 14 of [Cd. 7505].

Union-Castle Mail Steamship Company. The Canadian Government has contracts for subsidised services to the United Kingdom and to each of the Dominions of Australia, New Zealand, and the Union of South Africa. In each of these contracts clauses are inserted of a character definitely favourable to the promotion of inter-Imperial trade. We may instance in particular the clauses which require the contractors to furnish a schedule of freight rates which, when approved by the Minister of Trade and Commerce, cannot be varied except with the Minister's consent, and which empower the Minister at his discretion to fix maximum freight rates on any article conveyed between different ports of call.*

We see no reason to think that the policy of the Dominions has been any less successful than the procedure outlined by Your Majesty's Postmaster-General.

There is no doubt that a certain prestige attaches to mail contracts, and in the negotiations for them this fact should not be forgotten.

Development of Imperial Routes.

570. We come back then to the main point at issue.

The present mail route to Australia and New Zealand has certain undoubted advantages. On the other hand, it is open to the following objections:—

(*a*) It necessarily passes over foreign soil, and through the Mediterranean. Recent experience has shown that this route is particularly subject to attack and interruption.

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* *See* p. 123 of Part VI. of the Report of the Department of Trade and Commerce, 1915.

(*b*) It also leads through the Suez Canal, which, as we have shown, necessarily limits, and will limit, the draught of vessels using it, and is therefore at present unsuited to the development of high speed at a reasonable cost.

(*c*) It does not develop the oversea communications with any other part of the self-governing Dominions.

Is it not worth while to make an effort to initiate new Imperial services by alternative routes, which, while securing for the Empire a number of high-speed vessels, shall also effect improvement in Imperial communications as a whole? Our own view is that the collateral advantages which would accompany a change of policy render it expedient to make such an effort. Granted full co-operation between Your Majesty's Government and the Dominion Governments it should be possible to carry on satisfactory alternative services at a reasonable cost.

571. We suggest that such co-operation might take the following lines:—

(1) At present the mail contracts of Your Majesty's Government and the Governments of the Dominions are not arranged on any principle which enables the policy of the Empire with regard to its sea communications to be reviewed periodically as a whole.

Thus, the contract with the Peninsular and Oriental Steam Navigation Company for the conveyance of the Indian, Australian and China mails was to run for ten years from 1907. It was due to expire in 1916, and is now, we understand, being renewed from year to year.

The contract of the Commonwealth Government with the Orient Steamship Company runs for ten years from 1910, and is due to expire in 1920, subject to 24 months' previous notice.

The contract of the Government of the Union of South Africa with the Union-Castle Mail Steamship Company is due to expire in September, 1922, subject to 12 months' previous notice.

The contract of the Canadian Government with the Union Steamship Company of New Zealand ran for five years from 1911 to 1916, and is now, as are all the Canadian ocean contracts, being renewed from year to year.

We suggest that the Governments concerned should so arrange matters that in 1921, when the time for giving notice in respect of the latest of the mail contracts expires, they may be ready to initiate new Imperial services.

(2) During the intervening period, as we have already suggested, the authorities concerned should occupy themselves in deepening selected harbours on the routes—

(*a*) from the United Kingdom to Australia *viâ* the Cape of Good Hope;
(*b*) from the United Kingdom to Australia *viâ* Eastern Canada, Jamaica, the Panama Canal and New Zealand;
(*c*) from Western Canada to New Zealand and Australia;

on the lines indicated in paras. 542 to 555 of this Report.

(3) During the intervening period also tenders should be invited for the maintenance of new services—

(*a*) of 18 knots (sea speed) on the route from the United Kingdom to Australia *viâ* the Cape of Good Hope;

(*b*) of 18 knots (sea speed) on the route from Western Canada to Australia *viâ* New Zealand, with a branch service from Fiji to New Zealand as an alternative, to connect with a trans-Canada service and one across the Atlantic;

(*c*) of 20 knots (sea speed) from the United Kingdom to Eastern Canada.

It would only be in the event of failure to secure satisfactory contracts that we could recommend consideration of the alternative policy of constructing vessels to the order of the Governments, capable of maintaining the above speeds.

We recognise that to secure such speeds additional cost might be involved, but it would be minimised if the harbours on the routes had been deepened on the lines proposed. In any case, our view is that the general advantage to Imperial communications as a whole by the development of new services would more than compensate for the expenditure required. We do not touch on the enormous advantages which the possession of vessels of the speeds proposed would secure to the Empire in time of war as well as peace.

(4) For the period subsequent to 1922 we think that the best arrangement for the mail services to Australia and New Zealand would be on the following lines:—

FIRST WEEK.

ROUTE VIÂ BRINDISI, THE SUEZ CANAL, FREMANTLE, AND THE AUSTRALIAN TRANSCONTINENTAL RAILWAY.

For the reasons which we have stated above we do not think that it would be profitable, from the point of view of the self-governing Dominions as a whole, to spend money on increasing the speed of vessels to Australia and New Zealand which use the Suez route. We should, therefore, be content to see the mails from the United Kingdom landed at Fremantle in much the same time as at present, and thence conveyed to Eastern Australia by the new Transcontinental Railway. They would then arrive at Adelaide in, say, 27 days, at Melbourne in 28 days, and at Sydney in 29 days after leaving London. They would be conveyed to New Zealand by the then existing services.

In order to show, however, the time which would be taken if the speed of the steamers on the route were increased from the present 15·16 knots to 17 knots (sea speed) and a speed of 30 miles per hour attained on the Transcontinental Railway in Australia, we give the following table:—

——	Distance.	Speed per Hour.	Time.
	Nautical Miles.		Hours.
London to Southampton, 80 miles... ... =	70	50 miles	2
Southampton to Gibraltar	1,142	17 knots	67
Gibraltar to Port Said ...	1,913	,,	113
Port Said to Suez ...	87	(In Canal)	24
Suez to Aden	1,309	17 knots	77
Aden to Colombo ...	2,100	,,	124
Colombo to Fremantle ...	3,121	,,	184
Fremantle to Adelaide, 1,672 miles ... =	1,463	30 miles	56
			647
		Stoppages.	
		Gibraltar...	6
		Aden ...	3
		Colombo ...	24
		Fremantle	6
			686
			= 28 days 14 hours.

From this time four days should be deducted for saving on account of transit of the mails overland to Brindisi and thence by special steamer to Port Said. The time to Adelaide would thus be reduced to 24 days 14 hours.

SECOND WEEK.

ROUTE VIÂ EASTERN CANADA, VANCOUVER, AUCKLAND, AND SYDNEY.

The times for a service *viâ* Canada and the Pacific, assuming a 20-knot speed across the Atlantic and 18 knots across the Pacific, may be estimated as follows : —

—	Distance.	Speed per Hour.	Time.
	Nautical Miles.		Hours.
London to Liverpool, 201 miles ... ... =	175	50 miles	4
Liverpool to Halifax ...	2,509*	20 knots	126
Halifax to Vancouver, 3,656 miles ... =	3,175	40 miles	91
Vancouver to Honolulu ...	2,420	18 knots	135
Honolulu to Suva ...	2,783	,,	155
Suva to Auckland ...	1,139	,,	63
Auckland to Sydney ...	1,274	,,	71
			645
		Stoppages.	
		Halifax and Vancouver	12
		Honolulu	6
		Suva ...	6
		Auckland	6
			675 = 28 days 3 hours.

* This distance varies from 2,443 to 2,639 nautical miles, and the distance given above is the average for the year, taking into consideration the length of time in the year during which each route is available.

Note.—If Quebec were taken as the terminal port in Eastern Canada during summer navigation a saving of eight hours could be effected on the times given above.

The distance from Liverpool to Quebec varies from 2,623 to 2,856 nautical miles, and 2,748 nautical miles may be taken as the average, having regard to the time during which each route is available.

The distance from Quebec to Winnipeg is 1,351 miles, and from Winnipeg to Vancouver, 1,484 miles.

It is obvious that such a service which would land mails in New Zealand in 25 days would be considerably better for the Dominion than that which it now enjoys.

The time taken in the case of Australia also shows some saving, and it could be further shortened by a considerable amount if the direct route were to Sydney, and there were a branch from Fiji to Auckland. The distances and times would then work out as follows:—

—	Distance.	Speed per Hour.	Time.
	Nautical Miles.		Hours.
London to Liverpool, 201 miles ... ... =	175	50 miles	4
Liverpool to Halifax ...	2,509	20 knots	126
Halifax to Vancouver, 3,656 miles ... =	3,175	40 miles	91
Vancouver to Honolulu ...	2,420	18 knots	135
Honolulu to Suva ...	2,783	,,	155
Suva to Sydney	1,737	,,	97
			608
		Stoppages.	
		Halifax and Vancouver	12
		Honolulu	6
		Suva ...	6
			632 = 26 days 8 hours.

If the service were across Ireland to a western Irish port, *e.g.*, Galway, and thence to Eastern Canada, a further considerable saving in time and distance would be effected. This proposal has found considerable favour both in the Mother Country and the Dominions.

THIRD WEEK.

ROUTE VIÂ CAPE TOWN AND ADELAIDE.

The times for such a service, assuming 18 knots sea-speed throughout, would work out as follows:—

—	Distance.	Speed per Hour.	Time.
	Nautical Miles.		Hours.
London to Southampton, 80 miles ... =	70	50 miles.	2
Southampton to Teneriffe	1,525	18 knots.	85
Teneriffe to Cape Town...	4,430	..	246
Cape Town to Adelaide ...	5,587	..	311
			644
		Stoppages.	
		Teneriffe	6
		Cape Town	24
			674 = 28 days 2 hours.

This time is slightly shorter on the outward voyage to Australia than that taken under the existing mail contract, but it might be necessary to extend somewhat the period allowed on the homeward voyage, as the steamers take a more northerly route, and would naturally touch at Durban, though not necessarily at Cape Town. It is obvious that such an arrangement would provide a service once a month to and from the Union of South Africa considerably shorter than that which it now has.* The mails for New Zealand would be conveyed from Adelaide or Melbourne by the then existing services.

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* We do not, of course, overlook the possibility that, in future, it may be possible to convey the mails for South Africa to Swakopmund or Luderitz Bay by sea, and thence overland to the various centres.

572. We have given detailed times and distances for each route, so that the scheme may be considered as a whole.

It would need, as we have indicated, the close co-operation of Your Majesty's Government and the Governments of Canada, Australia, New Zealand, and the Union of South Africa, but we venture to suggest that it offers greater opportunities for such co-operation than any scheme hitherto proposed.

We may also point out that there are exceptional facilities for the supply of coal at a cheap rate from the abundant deposits in Nova Scotia for the service to and from Eastern Canada, and from the equally abundant resources of the Transvaal and Natal for that *viâ* the Cape of Good Hope.

We cannot, however, emphasize too strongly that the satisfactory accomplishment of the scheme is largely dependent upon the preliminary deepening of the harbours on the new routes to the required extent, so as to reduce, as far as possible, the cost of the higher speed.

573. The proposed scheme may be criticised on the ground that as the services start in different directions from the United Kingdom (one going east, one south and then east, and one west), the mails conveyed under the new arrangements would arrive at certain points at somewhat irregular intervals. This is, of course, the inevitable result of any plan which has for its object the linking up by different routes of the widely scattered parts of the Empire.

In the case of New Zealand, however, similar irregularity already exists. Mails sent out from the United Kingdom by way of Vancouver now arrive some days earlier than those despatched *viâ* the Suez Canal at the same time.

As to Australia, examination shows that, if Melbourne is taken as the central point, the mails can arrive by the different routes in substantially the same time.

Service to Newfoundland.

574. We have not been able to make suggestions for any new service stopping directly at Newfoundland, but the existence of fast steamers across the Atlantic to Eastern Canada should afford a useful means of supplementing communication with the Colony, though we hope to see a more satisfactory direct service with the United Kingdom in the future than has existed in the past. We called attention to the existing deficiencies in our Fourth Interim Report. The distance from Halifax to St. John's, Newfoundland, is 543 nautical miles, which can be covered in less than 40 hours by steamers with a speed of 14½ knots. If therefore it could be arranged (as no doubt would be possible during part of the year at any rate) for the Imperial Transatlantic service to connect with the existing or an improved service between St. John's and Halifax, there would be communication between the United Kingdom and Newfoundland in 7½ days.

Service to New Zealand and Australia viâ Eastern Canada, Jamaica, and the Panama Canal.

575. We are further of opinion that there would be considerable Imperial advantages in developing the route to New Zealand and Australia *viâ* Eastern Canada, Jamaica and the Panama Canal. We are convinced that the route *viâ* the Panama Canal will become increasingly used for traffic to and from Australia and New Zealand. It is not, however, generally realised that, whereas the distance from England to Colon, *viâ* Jamaica, is roughly 4,560 nautical miles, the distance to the same point *viâ* Halifax, Bermuda and Jamaica only amounts to 4,960 nautical miles; in other words that the additional calls at Halifax and at Bermuda only add 400 nautical miles to the total distance.

576. We do not think that, at present, it would be possible to use this route for vessels of high speed, such as those contemplated for the new routes already proposed, but we are strongly of opinion that an intermediate service of, say, 16 knots speed should be developed on this route.

The following table shows the distances and times for a 16-knot service:—

——	Distance.	Speed per Hour.	Time.
	Nautical miles.		Hours.
London to Liverpool, 201 miles ... ... =	175	50 miles.	4
Liverpool to Halifax ...	2,509	16 knots.	157
Halifax to Bermuda ...	753	,,	47
Bermuda to Kingston ...	1,142	,,	71
Kingston to Colon ...	560	,,	35
Panama to Tahiti ...	4,490	,,	281
Tahiti to Auckland ...	2,215	,,	139
Auckland to Sydney ...	1,274	,,	80
			814
		Stoppages.	
		Halifax ...	12
		Bermuda ...	6
		Kingston ...	6
		Panama Canal	24
		Tahiti ...	6
		Auckland...	6
			874 = 36 days 10 hours.

577. The creation of a service by this route, even though relatively slow, would give an opportunity for the conveyance of mails to New Zealand in 33 days, *i.e.*, several days less than the normal time at present *viâ* the Suez Canal. It would have the advantage of further developing trade between Australia and New

Zealand on the one side and Eastern Canada on the other. At present there is only a slow outward service from Eastern Canada to Australia and New Zealand.[*] It would also have the very considerable merit of developing a better service between the United Kingdom and Canada on the one hand, and Bermuda and Jamaica on the other. The service from the United Kingdom to the places last named has been sadly deficient since the termination of the Imperial Direct West India mail service, whilst Canada and Jamaica have long felt the need of improved ocean communication.

Lastly, we feel sure that many travellers between Australia and New Zealand and the Mother Country would welcome the opportunity of coming by this route, which would give them a chance of seeing something of Eastern Canada, as well as of the West Indies.

Postal Rates.

578. It will be convenient before leaving the subject of shipping communications to take up a smaller question, but one of considerable and growing importance to Australia, New Zealand, and the Union of South Africa, in connection with postal rates. We refer to the rates now charged on periodicals, magazines, trade papers, and newspapers sent out from the United Kingdom.

Since 1907 an agreement has been in force whereby there has been a special low rate for periodicals, &c., sent from the United Kingdom to Canada and Newfoundland.[*] This rate has been of immense value in developing the circulation in the North

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[*] It is subsidised by the Canadian Government to the extent of 29,000*l.* per annum. *See* Part VI. of the Report of the Department of Trade and Commerce, Canada, 1915.

[†] Coulter, p. 232 of [Cd. 8458].

American Dominions of British magazines, trade periodicals, &c., as the following statistics show:—

Estimated Weight of Newspapers, Magazines, and Trade Journals, sent from the United Kingdom to Canada and Newfoundland by Magazine Post.

Year.	To Canada.		To Newfoundland.	
	Amount.	Percentage Increase or Decrease on 1908.	Amount.	Percentage Increase or Decrease on 1910.
	Lbs.		Lbs.	
1908	2,328,000	—	—	—
1909	2,910,000	+ *25·0*	—	—
1910	3,836,000	+ *64·8*	23,565	—
1911	4,747,000	+ *103·9*	31,600	+ *34·1*
1912	5,785,000	+ *148·5*	33,700	+ *43·0*
1913	7,185,000	+ *208·6*	44,300	+ *88·0*
1914	7,800,000	+ *235·1*	49,000	+ *107·9*

NOTE.—The Canadian Magazine Post was first introduced on May 1, 1907, and the Magazine Post to Newfoundland in September, 1909.

So far, however, the efforts made to extend a similar system to Australia, New Zealand, and the Union of South Africa have been unsuccessful.*

579. For purposes of comparison we give the following figures showing the weight of "printed papers, commercial papers, and samples," despatched from the United Kingdom to the various Dominions, as stated in the Annual Reports of Your Majesty's Postmaster-General.

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* *See* p. 126 of [Cd. 7710].

Year.	To Canada and Newfoundland		To the Commonwealth of Australia.		To New Zealand and Fiji.		To South Africa.	
	Amount.	Percentage Increase or Decrease on 1906.	Amount.	Percentage Increase or Decrease on 1906.	Amount.	Percentage Increase or Decrease on 1906.	Amount.	Percentage Increase or Decrease on 1906.
	Lbs.		Lbs.		Lbs.		Lbs.	
1906 ...	2,309,000	—	1,639,000	—	801,000	—	2,486,000	—
1907 ...	3,589,000	+ *55·4*	1,716,000	+ *4·7*	828,000	+ *3·4*	2 252,000	— *9·4*
1908 ...	4,008,000	+ *73·6*	1,798,000	+ *9·7*	899,000	+ *11·0*	2,210,000	— *11·1*
1909 ...	4,589,000	+ *98·7*	1,854,000	+ *13·2*	987,000	+ *23·2*	2,200,000	— *11·5*
1910 ..	5,844,000	+ *153·1*	2,224,000	+ *35·7*	1,086,000	+ *35·6*	2,430,000	— *2·3*
1911 ...	6,992,000	+ *202·8*	2,500,000	+ *52·5*	1,122,000	+ *40·1*	2,580,000	+ *3·8*
1912 ...	8,106,000	+ *251·1*	2,980 000	+ *81·8*	1,216,000	+ *51·8*	2,657,000	+ *6·9*
1913 ...	9,447,000	+ *309·1*	3,472,000	+ *111·8*	1,320,000	+ *64·8*	2,604,000	+ *4·7*

These figures show that the development in the traffic in printed matter to Canada and Newfoundland, the Dominions which enjoy the special "magazine post" rates, has been far more rapid than the increase in the amounts of printed matter despatched to the other Dominions.

580. It is of considerable importance that all the Dominions should enjoy similar advantages in a matter of this kind, and we strongly recommend that the co-operation and assistance of Your Majesty's Postmaster-General should be invoked in order to secure that the lower rates now obtaining in respect of periodicals sent to Canada and Newfoundland should be extended to Australia, New Zealand, and the Union of South Africa.

FREIGHT RATES.

581. We pass on to consider the question of freight rates, and the desirability, or otherwise, of Government control over them. The matter is one with which we were specially charged by Your Majesty's Government, in accordance with the wish of the Canadian Government.* It is also one which has been brought to our notice in various aspects in the other parts of the Empire which we have visited, and we have found throughout considerable public feeling on this as well as on other shipping questions. Nor is this unnatural, since owing to the increasing desire of the British manufacturer to find markets for his products in the Dominions, and the increasing production in the Dominions of food supplies and raw materials, a great portion of which goes to the United Kingdom,

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* For the circumstances, *see* pp. 127–132 of [Cd. 7710]. The question had been exciting public attention in Canada in the years immediately preceding the War, and it was the wish of the Canadian Government that it should be investigated by a joint commission composed of representatives of Your Majesty's Government and the Canadian Government. In the result, instead of a special commission being appointed, the matter was referred to us.

the issues involved are, as we showed in Chapter III. of this Report, of the gravest importance in relation to the proper development of the oversea trade of the Empire.

Relation of Freights to Tariffs.

582. We may commence by calling attention to an aspect of the question which hitherto has largely escaped notice. For some years past the Governments of the Dominions have extended tariff privileges to goods which are the produce and manufacture of the United Kingdom and of other British possessions. Correspondingly, it is urged in many quarters that Your Majesty's Government should grant a tariff preference to goods from the Oversea Dominions. It has not, however, been adequately realised that the rates of freight which may be charged on goods to and from the Dominions are, in many cases, a more important factor in the question of the development of inter-Imperial trade than tariffs and tariff privileges on the present scale.

583. Exact comparison is, of course, difficult, since, as a rule, in the British Dominions duties are levied *ad valorem*, and may vary for each individual article in a group, as well as for groups, of articles, whereas freight is charged per ton (weight or measurement). A rough basis, however, for the comparison is to be found in the practice of the Australian and New Zealand Governments in adding 10 per cent. to the home cost of goods to cover the charges for freight. This figure is probably a little below the actual cost of sea transport.* Tariff charges in these Dominions (calculated on imports of all merchandise, free and dutiable, excluding spirits, tobacco, &c., which are charged at specially high rates) were estimated by the

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* *See* page 137 of [Cd. 7351].

Commonwealth Statistician at a general rate equivalent to 11·7 per cent. *ad valorem* in the case of Australia, and 9·8 per cent. in the case of New Zealand in the year 1913. There is ground, therefore, for concluding that in pre-War times Australia was paying about the same amount for outward freights as in Customs duties, whilst New Zealand was probably paying more for outward freights than in duty. A similar generalisation may be made in the case of the Union of South Africa.

If the return freight charges to the United Kingdom are added, it will be seen that the total charges for sea transport on the completed exchange were a far heavier tax upon commerce than the total Customs duties paid.

584. It must be emphasised that this state of affairs obtained under pre-War conditions. During the War freights to Australia, New Zealand, and the Union of South Africa have increased generally by at least 75 per cent., and in the case of special goods by much more. The excess of freight over tariff rates has, therefore, increased. The prevailing view in the shipping world is that freights, even after the War, may not return to their pre-War level for a very long period.

585. It may be contended that there is this essential difference between ocean freights and tariffs, that the former represent a direct payment for services rendered, whereas the latter are amongst the methods devised by Governments for raising the money required for their needs. In our view, however, the point is irrelevant to the present argument. Freight and tariff rates being what they are, it is not too much to say that improvement in the cost of sea-transport is amongst the most important problems which confront the statesmen of the Empire to-day.

Position of Shipping Companies.

586. In most countries of the world steps have been taken to supervise or control railway rates, but when it is urged that ocean freight rates should be controlled in the same manner as are railway rates the reply has been that steamship companies are on an entirely different footing from railway companies. The latter, it is said, enjoy a monopoly, whereas the former do not.

This view was strongly put forward in the evidence tendered to us by the Secretary of the Liverpool Steamship Owners' Association. He urged that rates of freight must, in the last resort, be governed by the laws of supply and demand, and that it was impossible for shipowners in the long run to fix rates which it was unreasonable for producers to bear. In his view it was impracticable to take any action towards controlling freight rates unless the Governments concerned were ready either to grant special privileges to shipowners, *e.g.*, to guarantee minimum shipments, or themselves to engage in the carrying trade.*

587. The distinction between railway companies and steamship owners is, we think, founded on fact. As a general rule each country reserves its coasting trade to its own nationals (though the United Kingdom is a notable exception), but the ports of the world are free for oversea trade to ships of all flags. The world's carrying trade is conducted by a comparatively small number of liners and a number of tramps nearly 12 times as large.† If the rates on any given route are

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* Hill, page 15 ff. of [Cd. 7710]. *See also* further memorandum in [Cd. 8460].

† Estimates vary as to the proportion of liner tonnage to the whole; it may be as much as one-half, or as low as one-fifth. Sir J. Maclay, the recently appointed Shipping Controller in the United Kingdom, in giving evidence before the Royal Commission on Shipping Rings, estimated the proportion at 33 per cent. [Cd. 4668, p. 34.]

fixed too high by the owners of the liners, there is obviously great inducement for the tramp owners to enter the trade and secure a share in the high profits prevailing, with the result that the rates must fall. At the same time it cannot be denied that the opinion is largely held that the argument of the steamship owners is vitiated by their practice. It is contended that on many trade routes shipowners have been able to combine and in practice to create a virtual monopoly. It is pointed out that this monopoly takes various forms and is secured by various means, all of which were set out after full investigation by the Royal Commission on Shipping Rings in 1909.* So far, however, no action has been taken on any of the findings of that Commission. Your Majesty's Government has not yet been convinced of the necessity, or, if convinced, has not yet found the time, to take the matter in hand, in spite of the representations made by more than one Dominion Government.

Need for Supervision.

588. Our investigations have satisfied us that in normal times the combination of shipowners is strong enough to limit the freedom of shippers, whose varied and detached interests make it difficult, if not impossible, for them to combine in any effective opposition, and that therefore, in principle, it is not desirable that the operations of the steamship companies should remain longer without some measure of Government supervision.

We may give the following illustration of the danger which such combination and virtual monopoly is liable to cause to the proper development of inter-Imperial trade.

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* For convenience of reference the findings of the majority and minority report of this Commission are embodied in Appendix II.

Freight Discrimination.

589. In the pre-War period, as we pointed out in our Second Interim Report,* British steamship companies had made a practice of charging a lower rate to New Zealand from Hamburg and other German ports than from London on the same classes of goods. We may repeat the observations which we made then on this state of affairs:— "The net effect of this practice ". . . has been, and must be, to facilitate the "competition of German manufacturers with British "in New Zealand, unduly to handicap British manu-"facturers, and to destroy, at least to the extent of "the difference in freights, the advantage intended by "New Zealand to be given, by means of preference, "to the British manufacturer." No satisfactory explanation of the matter was given to us at the time by the companies concerned. No assurance, to the best of our knowledge, has been given either to Your Majesty's Government or to the New Zealand Government that similar practices will not continue after the War. The case is much the same with regard to the differential freight rates charged on asbestos from Canada to foreign and British ports, to which attention was drawn in our Fifth Interim Report.† It is not impossible to stop such practices when ascertained. For example, a differential stamp duty could be imposed, equivalent to the difference in freight, on goods which had been conveyed at the lower rate. Experience, however, has shown that action of this kind, if taken at all, is only taken after prolonged inquiry and delay, and that difficulties have arisen between a Dominion Government and Your Majesty's Government, owing to present limitations on the former's right to deal with questions affecting merchant shipping. For ourselves we regard it as intolerable that

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* Pp. 41-2 of [Cd. 7210].

† P. 27 of [Cd. 8457].

British shipowners should be in a position to initiate or countenance practices of a kind so directly inimical to British trade.

Measures to Control Shipping in the United States.

590. In 1914 a Committee of the United States House of Representatives, which had been investigating questions connected with shipping rates and combinations, put forward proposals for supervising shipping matters which it is worth while to reprint in full. The main recommendations of this Committee were as follows:—

> (1) That navigation companies engaged in the foreign trade should be brought under the supervision of the "Inter-State Commerce Commission," as regards the regulation of rates, and generally the conditions of water transportation which affect the interests of shippers.
>
> (2) That all carriers engaged in the foreign trade should be required to file for approval with the Inter-State Commission, copies of all written agreements (or memoranda of oral understandings) with other steamship companies, or with American shippers, railroad and transportation agencies, together with any modifications or cancellations.
>
> (3) That the Inter-State Commerce Commission should be empowered to order cancellation of any such agreements found to be discriminating or unfair, or detrimental to the commercial interests of the United States.
>
> (4) That the Inter-State Commerce Commission should be empowered to investigate fully complaints regarding the unreasonableness or unfairness of rates, or to institute proceedings on its own initiative, and to order such rates to be changed if unreasonably high or discriminating.
>
> (5) That this supervision should extend to freight classifications and to complaints relating to the adjustment of rates between classes of commodities.*
>
> (6) That rebating of freight rates and discrimination between shippers, or ports, should be prohibited.

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* *Note.*—The Committee pointed out that their object was not to prevent steamship lines from lowering rates to meet competitive conditions, but to protect shippers against unreasonably high rates arbitrarily imposed.

(7) That the Inter-State Commerce Commission should be empowered to investigate fully all complaints charging, (*a*) failure to give reasonable notice, (*b*) unfair treatment of shippers in the matter of cargo space, &c., (*c*) the existence of discriminating or unfair contracts with certain shippers, (*d*) unfairness in the settlement of claims, and indifference to the landing of freight in proper condition.

(8) That the use of "fighting ships" and deferred rebates be prohibited both in the export and import trade of the United States, and that carriers should be prohibited from retaliating against shippers by refusing space accommodation when available.

591. A good many of the recommendations of this Committee were carried into effect by an Act which was passed by Congress, and approved on September 7th, 1916.[*] This Act makes provision for the creation of a United States Shipping Board of five Commissioners, one of whose principal functions is to encourage and develop the United States mercantile marine either by the direct construction, purchase, lease, or charter vessels, or by the formation of a corporation or corporations for a similar purpose with a capital not exceeding $50,000,000. With this special aspect of the work of the new Board we are not immediately concerned here, though we call attention to it in connection with the proposals made above for the development of speedy ocean communication between the United Kingdom and the self-governing Dominions. We desire, however, to summarize those sections of the Act which deal with the control of ocean freights:—

(*a*) No common carrier by water is allowed (1) to pay deferred rebates, (2) to use a "fighting ship" for the purpose of excluding, preventing, or reducing competition, (3) to retaliate against any shipper, (4) to make any unfair or unjustly discriminatory contract with any shipper in regard to space, accommodation, loading, and landing of freight, or adjustment of claims.

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[*] Public, No. 260–64th Congress (H.R. 15455).

(*b*) Every common carrier by water must file with the United States Shipping Board a copy, or memorandum, of every agreement with another carrier fixing or regulating transportation rates or fares, controlling competition, &c., or in any manner providing for a working arrangement.

The Board may disapprove, cancel or modify any such agreement which it finds to be unjustly discriminatory or unfair.

(*c*) No common carrier by water shall (1) give unreasonable preference or advantage to any person, or to any description of traffic; (2) allow transportation for property at less than the regular rates by any unjust device or means; (3) persuade any Marine Insurance Company, &c., not to give a competing carrier as favourable a rate of insurance; (4) charge any rate which is discriminatory between shippers or ports, or unjustly prejudicial to United States exporters as compared with their foreign competitors.

(*d*) Every common carrier by water may be required by the United States Shipping Board to file with it under oath any periodical or special report relating to its business.

(*e*) The United States Shipping Board may act in case of any alleged violation of the Act, either on a sworn complaint or upon its own motion. Its reports and decisions are on record, and may be published.

592. We should add, that the term "common carrier by water," as defined in the United States Act, does not include ocean tramps.

Recommendations.

593. We have very carefully considered the proposals of the United States Committee, and the terms of the legislation to give effect to them, but we are not satisfied that these are such as to suit the world-wide activity of the British mercantile marine.

The importance to British interests of the continuance and development of the share of British vessels in the world's carrying trade is so preponderant that we think it essential to recommend only the minimum supervision required to safeguard the interests of producers and consumers at home and in the Oversea Dominions.

594. We are, however, unanimous in thinking, as we have indicated in the preceding paragraphs, that some measures of supervision are needed. In our opinion, the line which should be taken is as follows:—

(1) The contractors for the new mail services which we have recommended earlier in this Report, and for all other mail services subsidised in the future by Your Majesty's Government and by the Oversea Governments, should be required to submit a schedule of freight rates on the chief articles both of import and export, supervision of which is of importance in the national interest, for the approval of the Government or Governments concerned; these rates when approved should not be altered without consent. Adequate penalties should be provided under the contracts for any breach of these provisions.

(2) Similar action should be taken in the case of all vessels to the construction or operation of which contributions of any kind are made by Your Majesty's Government or the Oversea Governments.

(3) We are of opinion that the competent Ministries of Your Majesty's Government and

the Dominion Governments should be empowered each to set up a Board for the purpose of making enquiry where a *primâ facie* case is established that the interests of shippers are adversely affected by the action of steamship owners, or steamship conferences.

Suitable division of functions of these Boards would, of course, be necessary in order to avoid overlapping, *i.e.*, to secure that two Boards should not deal with the same cases as imports and exports respectively.

(4) With a view to securing for such Boards the necessary information required for the proper performance of the proposed duties, all steamship owners trading with the parts of the Empire concerned should be required to file with the competent Departments:—

(*a*) copies of all written agreements (or memoranda of oral understandings) with other shipping companies, British or foreign, and of all modifications in these agreements or understandings;

(*b*) copies of all similar agreements, &c., with individual shippers (whether British or foreign) and with railway and other transportation companies.

These Boards should also be given full powers for taking evidence and for ordering the production of documents.

(5) The Boards should be empowered to investigate fully complaints regarding the unreasonableness or unfairness of rates. They should also be able to initiate inquiry where they may deem it necessary.

(6) In particular, the investigations of the Boards should extend to freight classifications and to complaints relating to the adjustment of rates between classes of commodities. They should also extend to complaints regarding (*a*) failure to give reasonable notice of changes in classification or rates; (*b*) unfair treatment of shippers in the matter of cargo space, &c.; (c) the existence of discriminating or unfair contracts with certain shippers; (*d*) unfairness in the settlement of claims and indifference to the landing of freight in proper condition.

(7) The investigations of the Boards should be held in public, and their action should be especially exercised along the lines of conference and conciliation, with a view to dissipating misunderstandings, and the bringing about of amicable agreement between shippers and shipowners. We believe that action in this direction, combined with press publicity and an immediate report to the Ministerial and Parliamentary authority concerned, ought to suffice to rectify and correct abuses,* and,

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* The procedure outlined in this recommendation is analogous to that in the United Kingdom under the Railway and Canal Traffic Acts of 1888 and 1894. These Acts empower any person who considers that he is charged an unreasonable rate of charge, or is in any other respect treated oppressively or unreasonably by a railway company in the United Kingdom, to complain to the Board of Trade, which is authorised to endeavour to settle the matter amicably. Proceedings under these Acts have, we understand, been attended with satisfactory results. They are greatly favoured by traders, as is shown by the number of cases which are brought each year before the Board, and settled amicably. The Board of Trade submits to Parliament, from time to time, reports on the complaints made, and the proceedings taken, and these reports are published. Boards of Conciliation are also provided for by the Canadian Industrial Disputes Investigation Act of 1907. These Boards have powers of investigation and conciliation only, though strikes and lock-outs are made illegal prior to, or pending, reference to them. Their reports are made to the Minister of Labour in Canada, and are given press publicity by him.

therefore, we do not recommend that the Boards should be empowered to fix freight rates. We recognise, however, that some of the Governments may think it advisable to give judicial powers to their Boards, in addition to those suggested above, in order to enable them to enforce their decisions if and when conciliation fails.

(8) The case of differential freight rates should, in our judgment, be treated exceptionally. The Boards, in cases of this kind, should be entrusted with wider functions, including not only powers of conciliation and arbitration but authority, at their discretion, to order the abolition of differential rates which are found inimical to Imperial trade.

BILLS OF LADING.

595. Lastly, we revert to the question of bills of lading to which we alluded in our Second, Fourth and Fifth Interim Reports.* We there described the view which we found to be largely prevalent amongst the mercantile community of Australia, New Zealand, Newfoundland and Canada, namely, that shipowners in the United Kingdom endeavour in their bills of lading to contract themselves out of liability for loss or damage in respect of the goods which they carry, particularly from the United Kingdom to the self-governing Dominions, to an extent unfair in itself, and not now permissible under the legislation in force in the United States of America and in various parts of the British Empire.

596. In our consideration of this question we have studied the views tendered in evidence by shipowners

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* P. 42 of [Cd. 7210], p. 16 of [Cd. 7711], and p. 28 of [Cd. 8457].

as well as by shippers, and we have also had the opportunity of considering the discussion on the question which took place at the conference on Merchant Shipping Legislation in 1907 between representatives of the United Kingdom, Australia, and New Zealand.*

597. We may state shortly what we conceive to be the present position of affairs.

(1) It is not in dispute that under the Common Law of England, and in the absence of contractual provisions to the contrary, shipowners have to carry and deliver goods in safety, and are answerable for all loss and damage which may happen while the goods are in their hands as carriers, subject to certain excepted points, such as loss from "act of God" or "perils of the sea."

(2) It is admitted also that until a comparatively recent date shipowners generally accepted these liabilities and did not attempt to contract themselves out of them. But some 40 years ago it was discovered that the underwriters with whom shippers had insured could, in case of loss, take assignment of shippers' rights under their bills of lading and recover against shipowners. This led to a change of practice, and shipowners now endeavour to contract themselves out of liability in all save a very few contingencies.

(3) Under the Harter Act of the United States of America it is not lawful to insert in any bill of lading any clause relieving the owner or master of a vessel conveying merchandise from or between ports of the United States and foreign ports from liability for loss or

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* Pp. 100 4 of [Cd. 3567].

damage arising from negligence, fault, or failure in proper loading, stowage, custody, care, or proper delivery of merchandise. Legislation on similar lines has been passed in Canada, in the Commonwealth of Australia, and in New Zealand.

598. We have found practically unanimous opposition on the part of shipowners to legislation of this kind. On the other hand, we have found in all the self-governing Dominions a consensus of opinion in favour of it. There is also a large body of commercial opinion in the United Kingdom in the same direction.

599. It is difficult to see that legislation on the lines of the Harter Act can constitute an injustice to sea carriers. It would rather appear to be a protection to the better class of shipowners. It was stated in evidence by the chairman of the Australasian Section of the London Chamber of Commerce,* and again by the representative of the Liverpool Steamship Owners' Association,† that the better class of shipowners pay for damage caused by the negligence of their servants in the handling and stowage of cargo where a reasonable claim is established by the shipper, even apart from legislation. If that is so, legislation would only impose on these shipowners a liability which is now in practice admitted, while it would also protect them against the competition of less reasonable owners who take full advantage of the freedom from liability given by existing bills of lading.

600. It can scarcely even be urged that legislation on the lines of the Harter Act would be of inconvenience to United Kingdom shipowners, because their representative has assured us that the negligence clause in that Act, which is the basis of the legislation asked for by the shippers, is perfectly fair and reasonable,‡

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* Tredwen, Q. 661. p. 39 of [Cd. 7351].
† Hill, Q. 451, p. 36 of [Cd. 7710].
‡ *Id.*, Q. 425, p. 35 of [Cd. 7710].

and that the inconvenience of it, if any, has been so small that it has not raised freight from the United States of America.[*] Similarly we learned in Canada that the Canadian legislation has had no adverse effect on business.[†]

601. It is urged on behalf of the shipowners that nothing should be done which would handicap British shipping in competition with foreign shipping. It must be pointed out in reply to this contention that the largest German shipping companies, as the outcome of agreement between them and the shippers, adopted before the war a bill of lading under which the shipper is protected against the negligence of the shipowners' servants in the stowage, preservation, treatment and delivery of cargo, and under which the shipowner is responsible for seeing that at the beginning of the voyage the ship is properly fitted, equipped, manned, and provisioned, in a seaworthy condition, and capable of undertaking the intended voyage except as regards defects that could not have been discovered by the exercise of ordinary care. Moreover, the Norwegian Shipping Law makes the shipowner responsible for all loss or damage sustained by the goods carried, from the time of their receipt until their delivery, unless it is shown that damage or loss was caused by the act of God, &c., or resulted from the nature or packing of the goods.

602. The maintenance of the doctrine of freedom of contract is, no doubt, important, but the preservation of the rule that the contractor should be responsible for the negligence of his servants is, from an economic point of view, also important. We think that this rule should be established generally, and that it should be dealt with apart from the proposals which we have outlined above in regard to shipping freights.

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[*] *Id.*, p. 21 of [Cd. 7710].

[†] Ramsey, Q. 5269, p. 367, of [Cd. 8458].

It is a rule of law, now defeated by agreement to which one side claims to be an unwilling party, and it should be established securely and permanently.

603. We recommend, therefore, that legislation on the lines of the Harter Act should be passed in the United Kingdom, and we think that similar legislation should take effect in the Union of South Africa and in Newfoundland.

CHAPTER X.—HANDLING AND DISTRIBUTION OF PRODUCE FROM THE DOMINIONS.

604. The largest proportion of produce from the Dominions (and especially of that from Australia and New Zealand) comes through the Port of London and suggestions have been made to us that it would be desirable, by means of subsidy or otherwise, to divert some portion of the trade from London to provincial ports of the United Kingdom, which have great facilities for serving the large industrial centres in the midlands and north.

We desire to state at the outset that, whilst it is of course essential to fix the terminal ports beforehand for subsidised Imperial mail services, we are not prepared otherwise to make any recommendation that would tend to a preference for any particular port. It may be demonstrated by the advocates of a given port which desires to see traffic attracted to itself, that its geographical location is more advantageous for distribution than that of London or other market. Cost of carriage is, however, only one of a series of complicated considerations which determine the course of trade.* Experience throughout the world has abundantly proved that nothing is more difficult than the removal of a large market for produce or commodities from the place where it is established.

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* See *e.g.*, Pickstone, Q. 6693, p. 312 of [Cd. 7706].

Handling of Produce.

605. The Dominions have had direct steamship communication for many years with Liverpool, Glasgow, and Southampton as well as with London. More recently a direct service with other ports in the United Kingdom has been initiated. The fact remains, however, that the main traffic is still with the Port of London, and practically all the complaints which we have heard on the subject of the handling of produce relate to London. The main complaints are the following:—

> *Comparative Charges at the Port of London and elsewhere.*—Taking first the question of port charges, we have made careful investigation into the matter, and it is clear that the ruling charges in the Port of London are higher on staple articles of Dominion produce than are those at Liverpool and other large provincial ports. We call attention to a schedule submitted to us on behalf of the Port of London Authority, in which comparative charges are given.* The defence made is that the Authority has only been set up in recent years, and is pursuing a vigorous policy of development, which naturally involves considerable outlay. Further, in the words of the evidence, "the same "causes which make London dearer" (for instance the higher value of land and higher wages), "also make it the best market in the world, and "further, a market not only where the highest "prices are obtained, but where it is always pos-"sible to find a buyer, and also advantages in "regard to finance and insurance not obtainable "at other ports."†
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> *Dock Accommodation.*—Until the constitution of the new Port of London Authority in 1909 the

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* Broodbank, pp. 195-202 of [Cd. 7351].

† Broodbank, p. 75 of [Cd. 7351].

quay facilities, the shed facilities, and the comparatively shallow depth of water both in the fairway and in the various docks were altogether unworthy of the greatest port in the world; but the action of the new Authority has been energetic, and it appears to have taken a fairly wide view of the improvements immediately needed. Further extension in the accommodation for large vessels is, however, as we have shown, necessary, and we hold that the first port in the world should rather lead than follow in the path of progress.

Perishable produce from neighbouring foreign countries which is conveyed in small vessels has the advantage of being brought nearer to the centre of London than similar produce from the Dominions.

Like facilities for goods brought to England in large ships are impossible so long as the Blackwall Tunnel prevents vessels proceeding above a certain point in the river. It would seem, however, expedient to modify the advantage now held by goods brought to the Port of London in small vessels by increasing the facilities for road and rail transport between the docks lower down the river and the central markets of Covent Garden and Smithfield. The roads between the river and these markets are now frequently congested and we suggest that the Port of London Authority should devote early attention to the matter in conjunction with the Road Board and the local authorities concerned.

We think that the Dominions are entitled to ask for all possible facilities in this direction.

Absence of Cold Storage for Sorting Carcases.—Witnesses, both in New Zealand and Australia, called our attention to this point,* and there is no doubt that the absence of low temperature accommodation for sorting was a source of trouble for many years. The defect has now been remedied by the erection of two cold storage sheds for sorting at the Royal Albert Docks.* Mr. Gilbert Anderson, giving evidence on behalf of the Incorporated Society of Meat Importers, was satisfied that the result of this step would be to reduce the damage in handling meat to a minimum.†

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* J. G. Wilson, Q. 2687. p. 160 of [Cd. 7170]; J. Cooke, Qs. 7793, 7916, pp. 31–33 of [Cd. 7172].

Lack of Cold Storage Accommodation at Tilbury.—This point was brought to our notice in Australia,‡ but it was stated in evidence by the representative of the Port of London Authority that there was no demand by the trade for cold storage at Tilbury,§ and this view was confirmed by Mr. Gilbert Anderson to whose evidence we have already referred.‖ It is clear that, in the absence of such demand, it would be useless for the Port of London Authority to provide the accommodation.

Conveyance of Meat in Barges.—It was suggested in evidence that the quality of frozen meat deteriorates owing to the system now in force of conveying it up the Thames in barges.¶

We do not consider that this complaint amounts to very much, as there is evidence that the percentage of damage in barges is comparatively slight,** such as there is appears to be partially due to the multiplicity of marks and numbers on carcases, which leads to delay in filling the barges.††

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* Broodbank, p. 73 of [Cd. 7351].
† Anderson, p. 103 of [Cd. 7351].
‡ Bechervaise, Q. 8043, p. 41 of [Cd. 7172].
§ Broodbank, p. 75 of [Cd. 7351].
‖ Anderson, p. 101 and Q. 1879, p. 112 of [Cd. 7351].
¶ Bechervaise, Q. 8029–40 of [Cd. 7172].
** Anderson, Q. 1883, p. 112 of [Cd. 7351].
†† *Id.*, p. 102 of [Cd. 7351].

Insulated barges of the most approved design are invariably used by the Port of London Authority and are inspected from time to time by the Institute of Underwriters. Arrangements have now been made for barges used by private firms to be surveyed periodically by Lloyd's Register of Shipping.

606. Looking at the question as a whole, we feel justified in saying that practically all reasonable causes of complaint against the Port of London Authority appear to have been removed or to be in process of removal.

The exception is the arrangements for road transit to the markets, to which, as suggested above, the Authority should, in our judgment, devote special attention.

Marketing of Produce.

607. Complaints as to marketing relate mainly to London and have had reference chiefly to fruit, the trade in which has developed with great rapidity during the past few years.

It was suggested by one witness in Australia that the producers do not obtain the best value for their fruit, either from the auctioneers or the commission agents in London,* but the suggestion was strongly denied in evidence in London from both classes of sellers mentioned above,† and it is noticeable also that Mr. Henry Jones, who has large interests in the Tasmanian fruit business, expressed himself as satisfied that the selling arrangements could not be materially improved upon.‡ Witnesses in the Union of South

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* J. H. Cook, Q. 8211, *ff*. p. 47 of [Cd. 7172].

† Pp. 113-124 of [Cd. 7351].

‡ Jones, Q. 8504-6, p. 61 of [Cd. 7172].

Africa also had no special fault to find with the arrangements for the disposal of their fruit at Covent Garden.*

608. Canada, New Zealand, the Union of South Africa, and some of the Australian States (*e.g.*, South Australia and Victoria) have appointed officers in the United Kingdom, part of whose duty it is to superintend the unloading of produce at the docks and its sale at the central markets. The presence of such officers at the sales affords the best practical safeguard against dangers of the kind suggested.

609. One point of procedure, however, deserves attention. We have visited the sales of fruit by auction at the two chief markets in London, Covent Garden and Pudding Lane, and find that, at the latter place, a statement is issued officially by the auctioneer showing exactly the price realised by each consignment. This statement enables the producer, or his representative, or any Government official attending the sale, to verify the price offered and accepted.

No statement of the kind is issued after auction sales at Covent Garden, and we suggest that Covent Garden should copy the practice of Pudding Lane in this respect.

General Schemes of Improvement.

610. Suggestions have been made that the produce of the Dominions, particularly meat, fruit, butter, &c., would become better known and appreciated if it were sold in retail shops started for the purpose in various parts of the United Kingdom, or if it were prominently displayed and sold at a special mart in London, which could be either in the neighbourhood of the docks or in some central site, *e.g.*, near Aldwych.

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* Pickstone, Q. 6717, p. 312: Woodhead, Qs. 6857 60, p. 316 of [Cd. 7706].

Witnesses of experience in the various trades have given evidence on these suggestions, and we briefly summarise their views.

Retail Shops.—If a number of retail shops for Dominion produce were started they could not permanently succeed unless they were assured not only supplies of all varieties of produce, but also (what is more important still), regularity of supplies through the different seasons of the year.

At present it is very doubtful whether the necessary variety or absolute regularity can be secured.*

It has also to be remembered that a very large amount of capital would be needed to carry out successfully an enterprise of this kind.

Market in Central Site.—The proposal for a special market on some central site in London, primarily for fruit from the Dominions, but adapted for other produce also, first made to us by Lord Grey† and endorsed by several witnesses,‡ is one of great attractiveness. Witnesses have pointed out, however, that under existing conditions the proposal is open to the same objections as those already mentioned in reference to the opening of retail shops, namely the difficulty of providing variety and regularity of supplies.§ We must add that it involves the further difficulty of the transfer of business from an existing market, not an easy procedure in any case and one which naturally arouses opposition from those engaged in the trades affected.‖ A very definite gain must, therefore, be proved before action can wisely be taken.

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* Nelson, p. 181–2 of [Cd. 7170]; Cooke, Q. 7788, p. 31 of [Cd. 7172]; Anderson, Q. 1739, p. 106 of [Cd. 7351].

† Grey, p. 303 of [Cd. 6517].

‡ *e.g.*, Mead, Q. 2790–1, p. 125 of [Cd. 7171]; Jacoby, Q. 8831–2, p. 78 of [Cd. 7172].

§ Hackett, Q. 8923–4, p. 82 of [Cd. 7172]; Dennis, Q. 2015 *ff.*, p. 121 of [Cd. 7351].

‖ Monro, Q. 1932, p. 116 of [Cd. 7351].

Market at Docks.—Lastly, the suggestion that there should be a special market for Dominion produce at some convenient position in the London Docks,[*] has not commended itself to our witnesses. They point out, and we think rightly, that the retailers concerned would not welcome transfer of the market to a site of undoubted inconvenience, and that, probably, the only result would be an increase in the number of middlemen, and an inducement to speculation.[†]

611. We come to the conclusion that, at any rate in the present stage of development of the Dominions, none of these suggestions are practicable and that, subject to the two suggestions which we make below, the further development of facilities for the supply and sale of their produce must depend in the main on private enterprise and business ability.

For example, a reduction might be effected in the present multiplicity of marks on meat, which causes trouble at the port of discharge and increased storage charges.[‡]

Improvement also appears to be needed in the dressing of meat and, in some cases, in the loading facilities in Australia and New Zealand.[§]

Again, the method of filling boxes and the grading and packing of fruit in Australia, though admittedly improving, does not seem to have attained the standard reached in fruit from other countries, particularly from the United States of America.[||]

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[*] *See* Wilson, Q. 2717, p. 161 of [Cd. 7170].

[†] Anderson, Q. 1741, p. 106; Monro, Q. 1933, p. 116 of [Cd. 7351].

[‡] Anderson, p. 102 and Q. 1711 *ff.*, p. 105 of [Cd. 7351].

[§] Anderson, pp. 103–4 of [Cd. 7351].

[||] Monro, p. 115 of [Cd. 7351].

612. The two points on which Governmental action is, we think, both possible and desirable are these:—

First, the Dominions generally should follow the practice already adopted in some cases:—

(*a*) In insisting on self-registering thermometers on ships carrying their perishable produce.

This course has had excellent results in the case of Canadian produce*: it was adopted by the Commonwealth Government in its contract with the Orient Steamship Company; it was, we notice, recommended by both the Majority and Minority Progress Reports of the Royal Commission on the Fruit Industry of Australia,† and it was pressed for in evidence before us in the Union of South Africa.‡

(*b*) In appointing inspectors to superintend the unloading, and also to attend the sales, of their produce in London and other large ports.

Canada, New Zealand, the Union of South Africa and one or two of the Australian States have already adopted this practice, and, in our judgment, the system is worthy of extension to all parts of the self-governing Dominions.

Secondly, the United Kingdom has, at present, no uniform standard for the inspection of meat, all inspection being carried out by the municipal authorities. Witnesses have complained to us of the diversity of practice,§ and the general inconvenience, caused by this arrangement. We are strongly of opinion that the matter should be taken up as soon as possible by the competent Government authority in the United Kingdom.*

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* Grindley, p. 109 of [Cd. 6517].

† Commonwealth Paper 9 of 1913, pp. 17 and 24.

‡ Pickstone, Q. 6654, p. 310 of [Cd. 7706].

§ Blankley, Q. 2781, p. 168 of [Cd. 6517].

CHAPTER XI.—TELEGRAPHIC COMMUNICATIONS.

613. In the course of our visits to the various portions of Your Majesty's Empire which lie at great distances from the Mother Country the importance of the telegraph system as a means of communication and as a link between widely separated communities has been strongly impressed upon us. In this connection we quote the following remarks from our Second Interim Report† :—

> "We feel convinced from a careful study of the problem and from personal contact with all classes in Australia and New Zealand that the feeling of devotion to the Empire and of loyalty to the Mother County will be strengthened in proportion as increased facilities are offered for keeping in close personal touch with friends and relatives overseas. Cable communication tends to quicken the pulse of nationality and forms an effective supplement to the broader, though slower, interchange of thought and sentiment by means of postal communication. It reinforces the feeling of joint life in a manner not possible by correspondence when two months or more are required for a reply to any letter."

These views apply perhaps with the greatest force to Australia and New Zealand as being the Dominions most distant from the capital of the Empire; but their application to Canada, Newfoundland, and South Africa is, in our opinion, but little less evident.

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* Anderson, Q. 1892, p. 112 of [Cd. 7351].

† [Cd. 7210], p. 40.

614. Cable communication outside its commercial use is at present practically a luxury; we can only compare the use by the general public of the cable at the present time to the use of the letter service in the United Kingdom before the introduction of the penny postage in 1840. Charges are very high and the scales extremely complicated; it is often difficult to see what justification exists for many of the differences.* The popularisation of the cable service can only come with a simplification of the charges and their radical reduction. We should like to see some bold reform in the direction of lower rates which might revolutionise the cable system of the Empire as the introduction of the penny postage revolutionised the postal service of the United Kingdom. We are convinced that a scale which would permit at some time or other of the week the exchange of messages in plain language to and from the furthest parts of the Empire at a charge of, say, 6*d.* a word—a reduction which we believe could be effected—would attract an immense amount of traffic and serve to bring the distant communities of Your Majesty's Empire into close and rapid contact just as the introduction of the penny postage brought the remote parts of Ireland and Scotland into touch with London. The question is what practical steps can be taken towards the realisation of this ideal.

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* The full charges to the Dominions for cable messages are now as follows :—

Australia	3*s.* 0*d.* per word,
New Zealand	2*s.* 8*d.* per word,
Union of South Africa	2*s.* 6*d.* per word.
Canada	1*s.* 0½*d.* to 1*s.* 6½*d.* per word.
Newfoundland	1*s.* 0½*d.* per word.

with reductions for deferred, week-end, Government, and Press messages and in some cases for night cable-letters. There is also a wireless service to Canada and Newfoundland, the full charge for which is 8*d.* per word with reductions for deferred messages, &c.

Position of Private Cable Companies.

615. It is probably useless to expect any drastic reduction of rates from private cable companies. We recognise that these companies have shown great enterprise in the past, and that during the War they have done their utmost to foster communication within the Empire, with the result that the cables have been utilised to a far greater proportion of their full capacity than ever before.*

In normal times, however, cheap rates are only granted for non-urgent traffic in order to fill up the intervals between the hours of rush, and even this system is still in its infancy and greatly in need of extension and development. The companies rely for the bulk of their receipts on high prices for full rate messages. This method has proved satisfactory from the financial point of view, but it does not take into account the urgency of obtaining for Imperial trade and for social intercourse between far distant communities immediate reduction of the rates now prevailing.

616. It is sometimes contended that the necessity imposed on the cable companies of obtaining and renewing periodically landing licences from Your Majesty's Government will lead to an adequate reduction of rates. In our judgment the control is not effective and does not justify the hope that it will lead in the future to an adequate cheapening of the services. It was stated to us in evidence by the representative of the General Post Office of the United Kingdom that the power conferred by landing licences must be used very sparingly and with greatest discretion.† The Post Office appears to be guided by a

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* For example the companies have accepted special messages from members of the various Expeditionary Forces at greatly reduced rates and have given facilities for free messages reporting casualties, &c.

† Crabb. Q. 242, p. 13 of [Cd. 7173].

recommendation of a Departmental Committee which sat in 1902, to the effect that the power must be used mainly to meet unreasonable proposals from the cable companies or unreasonable rates.* It is also pertinent to remark that the Commercial Cable Company wrote to us saying that the demand for further reductions of rates was confiscatory and destructive, and one which it could not entertain.† It is noticeable, moreover, that the Western Union Telegraph Company's landing licences which expired in 1911, and those of the Commercial Cable Company which were due for renewal in 1915, have not been yet formally renewed. In both cases, we understand, the difficulty has arisen from the proposal to insert the "Control of Rates" clause in these licences.

617. It is, however, urgent that Your Majesty's Government and the Dominion Governments should take measures at the earliest possible moment to require all private cable companies to supply periodical returns of:—

(*a*) Their traffic of all kinds.

(*b*) The distribution of this traffic at different times of the day, in other words particulars as to the peaks and troughs of their loads.

We understand that Your Majesty's Postmaster-General has no recent information on either of these points, nor is there any obligation on the cable companies to supply it if asked for.

The possession of these particulars is essential if the Governments of the Empire are to be in a position to deal with cable questions with adequate knowledge of the facts.

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* Crabb, Q. 241, p. 13 of [Cd. 7173].

† P. 97 of [Cd. 7173].

State-Controlled Telegraphic Communication with Canada, Australia, and New Zealand.

618. We turn to other means of securing reduction of rates. It seems obvious that the most direct method is to secure State-controlled telegraphic communication between the United Kingdom and Australia and New Zealand through Canada.

In our Second and Fifth Interim Reports we mentioned the strong feeling which we found to exist in all three Dominions in favour of the project and the apprehension which they feel regarding foreign intrusion into the internal communications of the Empire.

There exists already a through service under State control from Montreal to Bamfield Creek, Vancouver Island, by means of a leased telegraph wire, and thence to Australia and New Zealand by the Pacific cable. What is needed to complete communication is a cable across the Atlantic, and a land line from Nova Scotia to Montreal under British control.

Existing Atlantic Cables and their Capacity.

619. The existing Atlantic cables, which number 17 in all, were stated by Mr. Samuel at the Imperial Conference of 1911,* to have each an average capacity of from 5,000,000 to 5,500,000 words per annum, and an actual traffic of 2,500,000 words. New developments in connection with submarine telegraphy are constantly emerging† and we should now estimate the total *average* capacity of each cable working duplex and provided with the most recent apparatus at 10,000,000 words per annum at least. The actual

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* [Cd. 5745], p. 301. The terminal points of the various cables are indicated in the map appended to this Report: for assistance in the revision of this map we are indebted to Mr. Charles Bright, F.R.S.E.

† *See* pp. 25-33 of [Cd. 7351], and Bright, p. 124-5 of [Cd. 7710].

number of words transmitted has increased owing to the "deferred" rate and to other facilities, but the proportion of capacity used, so far as we have been able to ascertain, does not represent in normal times more than 40 per cent. of the maximum capacity. The argument seems conclusive that with an unused capacity on existing lines of 6,000,000 words per cable per annum, or a total unused capacity of 102,000,000 words per annum, no case has been made out for the physical necessity of adding to the number of cables.

Means of obtaining Control of one of the Existing Atlantic Cables.

620. Accordingly, we think that measures should be taken, either during the War or immediately after it, to obtain for the Empire one of the cables now existing across the Atlantic. Whether the method employed should take the form of a lease* or whether other steps may be possible does not appear to us to be the most material question. The essential point is that for Imperial purposes and in order to obtain immediate reduction of the rates now prevailing, it is urgent to secure control of one of the cables now crossing the Atlantic, and concurrently to erect or obtain control of a land line to Montreal from the landing point of the cable in Canada to join the existing line from Montreal to Bamfield Creek.

Results of such Control.

621. We assume that in any case administration of the new services would be handed over to the Pacific Cable Board and we proceed to make suggestions for their exercise and development.

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* The suggestion for a leased cable was put by us in evidence to Mr. Stanley Goddard, European Manager of the Western Union Telegraph Company; he stated that there seemed no insuperable objection to such an arrangement (*see* pp. 5-6 of [Cd. 7710]).

(1) REDUCTION IN RATES TO AUSTRALIA AND NEW ZEALAND.

622. The first object should be a material reduction of the existing rates to Australia and New Zealand. As we stated in our Second Interim Report—“ The “ reductions hitherto effected . . . . represent a “ very small instalment of what is requisite to establish a cable service to Australasia worthy of the “ social and industrial requirements of the Empire. “ We regard them merely as provisional, and as a step “ to much more radical reductions in the future, and “ we feel convinced that if such reductions could be “ initiated their effect would be in the highest degree “ beneficial.”

This opinion we still hold.

623. The Pacific cable in 1915-16 carried a load of paying traffic to and from New Zealand and Australia, amounting to some 8,000,000 words; the receipts for the same period in respect of this traffic were nearly 300,000*l*. and the cable paid its way. The average rates for paying traffic of all classes worked out, we understand, at an average of 8½*d*. per word,* and it appears to us reasonable to conclude that granted a satisfactory load of traffic the Pacific cable lines will continue to pay their way provided an average charge of, say, 9*d*. a word for the conveyance of messages between Montreal and Australia and New Zealand is secured. The question naturally arises as to what ordinary rate and what rates for deferred and week-end traffic, &c. are necessary to produce this average result of 9*d*. a word.

624. We do not think that the distribution of traffic under war conditions as between full rate and other

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* This result may be contrasted with the statement made to us in evidence by the late Chairman of the Pacific Cable Board, that any rate which averaged under 1*s*. 4*d*. per word would cause loss to the cable (*see* pp. 36-7 of [Cd. 7173]).

messages can be taken as a basis. When the rush of special low-rate war traffic is over, and the unrestricted use of codes is again allowed, the proportion of ordinary to other traffic will probably approximate more closely to the pre-war than to the present figures. Examination of the traffic returns for the year 1913-14 shows that, of the total traffic, 42·6 per cent. was carried at ordinary rates, and the remaining 57·4 per cent. distributed over deferred, Government, Press and week-end messages. Assuming that deferred and Government traffic will continue to be carried at half rates, week-end messages at quarter rates, and so on, and allowing for some increase in deferred and press traffic, with some reduction in the proportionate charge for the latter, we calculate that to produce the average return of 9*d.* per paying word the full ordinary charge between Montreal and Australia and New Zealand should be fixed at 1*s.* 4*d.* per word.* Allowing for the cost of transmission between Montreal and the United Kingdom, for which, we understand, 10*d.* per word is now paid in respect of full rate traffic, it seems clear that an ordinary full rate of 2*s.* 2*d.* per word between the United Kingdom and Australia and New Zealand should be remunerative; the deferred rate would correspondingly be 1*s.* 1*d.* and the week-end rate 6½*d* per word.

625. Whilst these figures represent substantial reductions on present rates, they could be further reduced if messages could be carried between Montreal and the United Kingdom at a lower cost than the present rate of 10*d.* (full rate) which is now paid to the Atlantic Cable Companies. This appears to us to

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* This calculation is based on the assumption that the traffic will be divided as follows, viz. :—Ordinary 38 per cent., deferred 19 per cent., Government 6 per cent., press 13 per cent. deferred press 12 per cent., and week-end 12 per cent. It has also been assumed that the ordinary press rates will be one-sixth instead of five twenty-fourths of the full rate.

be unduly high. Granted that the receipts for an Atlantic cable and the land line to Montreal need to be as much as 100,000*l*. per annum (which we take to be an outside figure) in order to cover interest, depreciation, cost of working, &c., 5,000,000 words of traffic at an average charge of 4·8*d*. per word, or (if the traffic is divided according to the proportions given above) at a charge of 8*d*. per word (full rate), should be sufficient.

Such a reduction in rates would enable the full rate between the United Kingdom and Australia and new Zealand to be reduced to 2*s*., the deferred to 1*s*., and the week end to 6*d*. The same result substantially would be achieved if all Pacific traffic were carried across the Atlantic at the rates now offered by the Marconi Companies.

626. In making these proposals we have taken it for granted that the present terminal charge of 5*d*. per word on full rate messages now made by the Commonwealth Government will be largely reduced if not abolished. This charge, as we showed in our Second Interim Report,* can hardly be justified under existing conditions. We would add that, in our calculation, it has been assumed that the reduction of rates proposed would attract sufficient traffic to maintain a full load on the Pacific cable. Even if, however, this should not be the case for the first few years after the war, we are of opinion that the Imperial interests involved would more than justify the proposed reductions, which we regard as the minimum required.

(2) DEVELOPMENT OF CANADIAN TRAFFIC.

627. The second object should be to make experiments to obtain Canadian business to and from the United Kingdom. The sums payable on account of

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* P. 39 of [Cd. 7210].

Pacific traffic passing between the United Kingdom and Montreal would, of course, form the basis of the receipts of a State-controlled cable to Canada and of a land line from the landing point to Montreal, but this traffic alone would not form a full load for such a cable and land line. In 1915-16 the traffic transmitted between Europe and Australasia by way of the Pacific cable only amounted to about 5,500,000 words. This would represent little more than half the capacity of an Atlantic cable which, as we have already seen, would be about 10,000,000 words per annum. There would, therefore, be ample scope for handling further business to and from Canada.

628. There is some difficulty in obtaining such business from the United Kingdom at present, since unrouted messages to North America have now to be handed to the Western Union Company as representing the Anglo-American Telegraph Company. This arrangement, however, ceases in 1920, and we think that, as soon as State-controlled cable communication is available, offices might be opened by the Pacific Cable Board in the larger centres of the United Kingdom and Canada so as to attract traffic in the United Kingdom, and all kinds of business in the Dominion. The lowering of rates on the State-controlled Atlantic cable, on the lines suggested above, would naturally attract a considerable volume of such traffic.

(3) IMPROVEMENT OF PRESS SERVICE.

629. Thirdly, we suggest that immediate use should be made of the existence of a State-controlled Atlantic Cable to facilitate the distribution of Press news to Canada, and through Canada to other parts of the Empire.

Our visits overseas were made in years of acute international disturbance. We are bound to say that our hopes of finding in the newspapers of the

Dominions a full and accurate account of world-important events were far from realised. In Canada particularly (where news from outside the Dominion comes mainly through American agencies*), the lack of Imperial news at the outset and during the progress of the War was noticeable and disturbing.

In our judgment, few tasks are more urgent than that of securing the dissemination of Imperial news as widely and fully as possible. We therefore recommend and advocate the lowest possible press rates for news sent over the State-controlled Atlantic and Pacific cables.

We are confident that the already urgent demand for a better news service will be emphasised when the war is over and reconstruction begins.

Extension of Service to Newfoundland.

630. It would be preferable that the State-controlled Atlantic cable should land in Newfoundland, and be laid thence to Nova Scotia. Such an arrangement would increase the speed of working (the speed of a cable of given composition and dimensions varying inversely with the square of its length) and, at the same time, give the Colony all the advantages of the cheaper services.

But if, for any reason, this is found inexpedient and the cable goes straight to Nova Scotia, we suggest that the Newfoundland Government should, if necessary, arrange with the Canadian Government for the erection and maintenance of a land-line from the landing place of the State cable in Canada to the terminus of the Newfoundland Government cable at Canso.†

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* The system is fully described in our Fifth Interim Report *See* pp. 38–40 of [Cd. 8457].

† *See* p. 14 of [Cd. 7711]

As we have shown in our Fourth Interim Report, such an arrangement would enable through communication under Government control to be provided from Newfoundland, not only to the United Kingdom but to Canada, Australia, and New Zealand.

South African Service.

631. The proposals outlined above do not secure any reduction of the rates to and from the Union of South Africa, and the telegraph service of that part of the Empire requires special consideration. The base rate of 2*s*. 6*d*. per word between South Africa and the United Kingdom (which has been in existence since 1903) is undoubtedly high in comparison with that of 2*s*. 8*d*. which now exists to and from New Zealand. In recent years, however, the South African traffic receipts have been so small that, in spite of development caused by the facilities for "deferred" and week-end traffic lately introduced, the private companies operating the service have been entitled to receive from Your Majesty's Government, the Union Government, and the British South Africa Company the full subsidy of 13,500*l*. for which these Administrations are liable until 1919.*

632. We pointed out in our Third Interim Report that the recent decline in receipts for cable traffic on the South Africa service was mainly due to depression and inactivity in the share market, and that there was urgent need for the service to be placed on a wider and more stable basis by attracting a greater proportion of social and non-urgent messages. To this view we adhere. We advocate that such messages should be

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* The particulars of the arrangements under which this subsidy is payable are given on p. 48 of [Cd. 7505]. The subsidy is payable in full when the total receipts are less than 300,000*l*. In the event of the receipts exceeding 300,000*l*. half the excess is deducted from the subsidy.

encouraged by a reduction of rates corresponding to that recommended above in the case of Canada, Australia, and New Zealand, and we advise the Governments to guarantee to the companies temporarily a larger subsidy than that now payable.*

Nationalisation of the Cable Services.

633. We feel bound, however, to record our opinion that at no distant date the nationalisation of the private cable companies will become one of the most urgent problems for statesmanship, and we endorse the view on this subject expressed by the then Prime Minister of New Zealand at the Imperial Conference of 1911.† The proposals which we have outlined above will, in our judgment, do much to solve the problem of telegraphic communication with the Dominions, but difficulties will still remain in other parts of the Empire, where the prospects of traffic development as the result of rate reduction are not so bright.

634. It appears difficult, if not impossible, to attain the desired cheapness of cable communication throughout the Empire, as to the importance of which we hold the strongest views, without interfering with the rights of private companies, who have done much in the past to facilitate development of the oversea Dominions and to maintain the United Kingdom as the greatest world market both in the matter of finance and in that of many of the largest staple industries. We desire to record our sense of the obligation of the Empire to the pioneers of ocean telegraphy, and we should be averse to any action, taken in consequence of our recommendations or otherwise, which would deprive them of the reward of their enterprise, and would neglect to take into account their part in the

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* The present subsidy, as stated above, lapses in 1919.

† [Cd. 5745], p. 295.

development of the Imperial fabric and of British oversea trade. On the other hand, the urgency of placing cable communication on such a footing that it would be available not only to the rich, but to all classes, not only to the merchant, but also to the private individual, is manifest and imperative.

Wireless Telegraphy.

635. Many who recognise in whole or in part the justice of the foregoing considerations urge as a reason for deferring action that the probable developments in wireless telegraphy render it inopportune to consider the acquisition of private cable lines or the question of placing their traffic on the basis of a Government guarantee in order to reduce their rates to the requisite level.

The establishment of wireless communication is no doubt cheaper than the laying of a new cable. Its development will be, and has been, of material assistance in causing reduction of rates and multiplication of services. Its founders are entitled to every encouragement from the Imperial and Oversea Governments. Whilst, however, it would be foolish to forecast the future except under the most express reserve, the most competent authorities on this subject whom we have been able to consult hold the view that on the ground of speed, certainty, and secrecy in time of war, cable communication as opposed to wireless will long continue to hold the field as the most reliable means of telegraphic communication overseas.* There has been no slackening in the pace of cable construction since the advent of wireless.

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* Bright, Qs. 4419–20, p. 279 of [Cd. 6517] and Appleyard, Qs. 557 and 613, pp. 31 and 33 of [Cd. 7351].

CHAPTER XII.—IMPROVEMENT IN COMMERCIAL PRACTICE.

636. In this Chapter of our Report, we discuss three questions of considerable importance to the future of inter-Imperial trade, namely, the Trade Intelligence arrangements now in force in various parts of Your Majestys Dominions, the statistical systems of the Empire, and the value of various types of Exhibitions in the promotion of trade.

TRADE INTELLIGENCE.

637. We first deal with the organised official efforts made by the Governments of the various parts of Your Majesty's Empire to foster export trade by collecting and furnishing to manufacturers and merchants information as to openings for external commerce and other particulars likely to be of service to them in carrying on trade overseas.

638. Before considering the various official trade intelligence organisations which exist in the different parts of the Empire, we think it imperative to lay down some general outline of the principles on which work of this kind should be carried on. It appears to us that any organisation for the purpose of fostering the trade or commerce of a country cannot and should not deal solely with economic opportunities abroad. Enquiries in oversea markets can only be properly directed, and the results adequately utilised, in the light of a full knowledge of industrial requirements and industrial capabilities at home. The ideal Commercial Intelligence Department of any Government must therefore depend for efficient working as much on a staff of experts conversant with home industries as upon well-trained commercial representatives abroad. We fear that in the organisation of commercial services in the past this consideration has sometimes been overlooked, but we emphasise it, as it

is obvious that after the war there will be a keen competition amongst manufacturing countries to secure oversea trade for their industries. Improved methods of production, better systems of distribution, will be eagerly sought after. The State, whose trade intelligence service is organised in advance, will be best equipped to take advantage of opportunities.

The Board of Trade Department of Commercial Intelligence.

639. In the United Kingdom the work now going on is centralised in the Department of Commercial Intelligence of the Board of Trade, which collects and supplies to traders information as to trade openings, tenders, tariffs, possible buyers of British goods, &c. This information is, of course, acquired in a variety of ways. For purposes of the present enquiry the most important sources are the Trade Commissioners and Trade Correspondents in the Dominions, and the Consuls in foreign countries. With both these services we deal more in detail later on.

METHODS OF DISSEMINATING INFORMATION.

640. The work of the Department of Commercial Intelligence in disseminating trade information falls into two distinct classes:—

(1) *Answering Specific Enquiries.*—This work has recently increased greatly, as will be seen from the following statement of the number of enquiries dealt with during each of the last four years:—

——	1912.	1913.	1914.	1915.
Written enquiries ...	10,316	9,829	25,799	34,948
Personal enquiries ...	6,172	6,839	14,794	15,536
Total ...	16,488	16,668	40,593	50,484

The large accession of work in 1914 and 1915 resulted from conditions arising out of the War. Manufacturers and exporters sought the assistance of the Department in finding fresh outlets for their goods. At the same time the Department improved its machinery for obtaining information as to the capabilities and needs of British manufacturers and established a kind of clearing house for placing firms who had previously bought from enemy countries in touch with home manufacturers of the same or similar goods.

(2) *Circulating Trade Information.*—Reports as as to openings for British goods abroad and other information collected by the Department are disseminated to the commercial community chiefly through the medium of (*a*) the "Board of Trade Journal," which is issued each week, or (*b*) confidential notices supplied to Chambers of Commerce, and also to individual firms who may register their names for the purpose. Trade information of a general or public character is published in the weekly journal, whilst information of value from the point of view of international trade competition, which it is not considered desirable to publish in the "Journal," is distributed by means of the confidential notices we have mentioned. The number of firms on the special register for the receipt of confidential information increased from 1,500 at the end of 1913 to over 3,000 at the end of 1915. This number must, however, represent but a very small portion of the total number of business houses in the United Kingdom who are interested in trade abroad, and we are surprised to find that the facilities thus afforded

by the Department of Commercial Intelligence to British trade are not utilised to a greater extent by the commercial community.

Suggestions for Improvement.

641. The permanent usefulness of the Department of Commercial Intelligence would be increased if the facilities which it affords to traders were as readily available in the leading commercial centres of the United Kingdom as they are in London. For example, small branch offices might be opened in the leading manufacturing towns or ports, and in other centres the object in view might be attained by means of further co-operation between the Department and the Chambers of Commerce and trade associations.

642. Trade Commissioners visiting the United Kingdom (besides attending at the London office of the Department) spend a certain amount of time at the leading Chambers in the provinces and in Scotland and Ireland, in giving information and advice to traders. This system could be usefully extended if the Comptroller, or some other responsible officer of the Department, attended occasionally at the offices of Chambers of Commerce and other trade associations outside London.

643. These arrangements would enable merchants and manufacturers in all parts of the United Kingdom more readily to avail themselves of the knowledge and information collected by the Department, and would keep the Department more in touch with the needs and development of the manufacturing industries, which are mainly situated outside London. They would also provide machinery whereby the Government could readily consult commercial opinion in any district on matters of interest to trade.

ADVISORY COMMITTEE ON COMMERCIAL INTELLIGENCE.

644. An Advisory Committee was established in 1900 for the purpose of advising the Board of Trade on the work of the Commercial Intelligence Branch and on matters which the Board may refer to it. Its functions have been enlarged from time to time since its creation, and it has now a limited power of initiative.* It includes representatives nominated by the Governments of Canada, Australia, New Zealand and the Union of South Africa, as well as representatives of the commercial community of the United Kingdom. We would suggest that, in the event of an Imperial Development Board being set up on the lines which we indicate in Chapter XIV. of this Report, the representatives of the oversea Dominions on that Board might well be members of the Commercial Intelligence Committee.

645. The Committee has, at different times, with the approval of the Board of Trade, despatched special Commissioners to enquire into the conditions and prospects of British trade in various countries, and we are glad to find that the investigations of these Commissioners extend to matters affecting the trade of the Dominions, as well as that of the United Kingdom, with the countries to which they are sent.†

646. The Committee does not meet at, or actively supervise the work of, the Department of Commercial Intelligence, and it seems worthy of consideration whether its usefulness would not be improved by the appointment of a sub-committee, to include representatives of manufacturing, mercantile, and banking interests, which should meet at frequent intervals and advise the Comptroller-General as to the current work of the Department and as to directions it might be

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* Smith, Q. 2488, p. 161 of [Cd. 7351].

† *Id.*, Qs. 2499—2500, p. 162 of [Cd. 7351]

useful for that work to take in view of the commercial needs of the moment.

Commercial Intelligence Institutions in the Dominions.

647. In the oversea Dominions the Department of Trade and Commerce in Canada, the Department of Trade and Customs in Australia, the Department of Industries and Commerce in New Zealand, and the Department of Finance and Customs in Newfoundland are the branches of the administrations most analogous to the Board of Trade in the United Kingdom; several of the States of Australia also have similar institutions of their own. In the Union of South Africa, so far, no special department has been organised to deal with the work. The Agricultural and Customs Departments and the Department of Mines and Industries each have a share.

CANADIAN TRADE INTELLIGENCE SERVICE.

648. We call attention to the stage of development now reached in Canada in respect of the trade intelligence service, as it would seem well worth the study of the other Dominions.

649. The service forms an important branch of the activities of the Department of Trade and Commerce. The Department maintains in other parts of the Empire and certain foreign countries a service of Trade Commissioners and Correspondents. Information received from these officers, and enquiries for Canadian goods received from other quarters, are made known by means of a Weekly Bulletin, which (unlike the "Board of Trade Journal") is distributed free of charge.

650. The Department also issues periodically the "Export Directory of Canada," containing the names of Canadian firms in a position to do an export trade, and is preparing a special volume for the information

of its Trade Commissioners and other representatives abroad, who may receive local inquiries for the names of Canadian manufacturers and exporters. This latter compilation, which is not for publication and is apparently restricted to firms of which the Department has knowledge, besides giving particulars of the goods they produce, shows the countries to which they export, the names and addresses of their representatives abroad, and other information likely to assist the Trade Commissioners in their work. We recommend this branch of the work of the Canadian Department to the attention of the Board of Trade in London, as we regard it of importance that similar information relating to United Kingdom exporters should be in the hands of all the Trade Commissioners, Consular Officers and other trade representatives abroad.

651. On one matter of some importance there is a divergence of practice between the Department of Trade and Commerce in Canada and the Board of Trade in the United Kingdom. In Canada arrangements have been made for the publication of lists, compiled from particulars furnished by the Trade Commissioners appointed by the Dominion Government, of importers of Canadian produce and manufactures in various countries.* On the other hand the Board of Trade appears to regard its lists of importers of United Kingdom goods abroad as so confidential that they are not supplied even to Chambers of Commerce in the United Kingdom.† On this question we incline to support the attitude of the Board of Trade, who, we understand, take the view that it is not desirable to give such publicity to official lists of importers as would make them available to firms or persons who may be interested in supplying articles of foreign production.‡

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* **O'Hara, p. 397 of [Cd. 8459].**
† **Musgrave, p. 143 of [Cd. 7351].**
‡ **Smith, Q. 2448, p. 159 of [Cd. 7351].**

Trade Commissioners and Correspondents.

(*a*) FOR THE UNITED KINGDOM.

652. In our previous Reports, we have commented on the work of the Trade Commissioners appointed to report upon and assist the commercial interests of the Mother Country in the oversea Dominions.*

Considerable advantage has accrued not only by their work in the Dominions in which they are stationed, but also by their periodical visits to the Mother Country, and the resultant conferences with, and advice to, manufacturers and merchants at home.

653. We think it desirable that Trade Commissioners should be appointed in parts of Your Majesty's Empire other than the self-governing Dominions, and we are glad to learn that such an extension of the service is contemplated by the Board of Trade. We would urge that steps to this end be taken without delay, in order that United Kingdom manufacturers may be enabled, directly hostilities cease, to regain in such markets the footing which, owing to war conditions, they have had temporarily to cede to neutral suppliers. The establishment by Your Majesty's Government of a more extended system of trade representation in foreign countries has also been advocated,† and we heartily endorse this idea.

654. At present there are only four Trade Commissioners appointed by the Board of Trade: one for Canada and Newfoundland, one for Australia, one for New Zealand, and one for South Africa. It has been urged that the number of the Commissioners in the Dominions should be increased and there is much force in the plea. The Commonwealth of Australia

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* The functions of these officers and the system of utilising and distributing the information which they obtain by means of the Commercial Intelligence Department of the Board of Trade have been described to us in considerable detail by the Permanent Secretary to the Board. (*See* pp. 152 *ff.* of [Cd. 7351].)

† P. 15 of [Cd. 8181], recommendation 10.

and the Dominion of Canada in particular include within their wide geographical limits varied and distinct markets which cannot possibly be dealt with adequately by one officer.

655. The work of the Trade Commissioners in the Dominions is at present supplemented by the appointment in various cities of local correspondents who are remunerated by a retaining fee. This system does not appear to us to be satisfactory. Whilst it may be useful to retain by means of an honorarium, the services of local men in a few centres which are not of sufficient commercial importance to justify the appointment of a whole-time officer, we think that the trade interests of the Mother Country in the oversea Dominions should be, as far as possible, in the hands of whole-time officials. We prefer that a single responsible officer should be retained for each Dominion with whole-time assistance in important centres.

656. We recommend therefore that, in the self-governing Dominions, in addition to the existing Trade Commissioners, three junior Trade Commissioners should be appointed in Canada and also in Australia, and two junior Commissioners in South Africa. If these officers are given adequate allowances for travelling within the portions of the Dominions assigned to them, the retention of the Trade Correspondents will probably be found unnecessary in many cases. The junior Trade Commissioners should have emoluments and rank not greatly inferior to those of the senior Commissioners. They should work generally under the control of the latter and be trained to take their place.

657. We are also clearly of opinion that Trade Commissioners of all grades should be permanent officials, and should have a status adequate to their position as representatives of the Board of Trade, and sufficient to place them on a proper footing in the States where they

are stationed. It is also desirable that some regular system of recruiting officers for the service should be established. We should like to see some scheme in operation by which the Trade Commissioner service would offer an attractive career to men who, after completing a suitable university course, have spent three or four years in business or in a British Government Department in close touch with industry and commerce. Junior members of the Department of Commercial Intelligence might also be attached for short periods, say six months or a year, to the offices of the Trade Commissioners abroad.

658. Finally, we suggest that an arrangement should be made for periodic inspection of the offices and work of the Trade Commissioners by the Comptroller-General of the Department of Commercial Intelligence or other official of the Board of Trade, at regular intervals, say of four years. Such an arrangement should ensure better co-ordination of the work of the Trade Commissioners and their assistants. It should also help the Department of Commercial Intelligence and the Board of Trade generally to keep in closer touch with the conditions of trade in the Dominions and to gauge the value of the local work of the Commissioners. We urge this the more strongly as we have found that the authorities in the United Kingdom were insufficiently apprised of the relations of the Commissioners with the trading community and Government officers in the Dominions.

659. No doubt these changes will entail additional expenditure on the Exchequer, but in view of the volume and importance of the trade between the United Kingdom and the Dominions overseas, which it is the work of the Trade Commissioners to conserve and expand, the present cost of the system represents a very low rate of insurance, and is not, in our opinion, commensurate with the importance of the growing interests involved.

(*b*) FOR THE DOMINIONS.

660. The oversea Dominions also maintain Trade Commissioners and commercial agents in the United Kingdom and other parts of the Empire, and even in foreign countries; Canada, in particular, has established an extensive service, not only in the British Empire but in several foreign countries.

661. Appointments in the Canadian Trade Commissioner service are not pensionable, and have not the same degree of permanency as posts in the ordinary civil service of the Dominion. We regard it of importance that the Trade Commissioners should have a status which will render the service more attractive to suitable candidates, especially as the Department of Trade and Commerce is endeavouring to find recruits for its service amongst young men of higher education, who will undergo a period of training in the Department and in industrial centres in Canada before being appointed to posts in the Trade Intelligence Service abroad. Several appointments of this kind have already been made with success, and the experiment is one which is being continued.

Question of an Inter-Imperial Intelligence System.

662. The commercial intelligence system of the United Kingdom, and those of the oversea Dominions, are now independent of each other, and it has been suggested that it would be desirable to have some organised system of co-operation between the Mother Country and the Dominions in the work of collecting commercial intelligence, and in watching over trade interests in various parts of the Empire.

663. In many instances we see no practical difficulty in the way of such co-operation, provided that each Trade Commissioner remains, as he is at present, under the ultimate control of a single authority. To take one example we were informed in Canada that no

arrangements existed for the representation there of the trade of Australia, New Zealand, and South Africa; there is little or no competition between the commercial interests of these Dominions and those of the Mother Country in Canada, and the joint work could easily be entrusted to the United Kingdom officers, who would remain primarily responsible to the Government by which they were appointed. Similar arrangements could be made in other parts of the Empire and in foreign countries, by agreement between the Governments concerned. Governments represented in this way might make a contribution towards the cost of the service in proportion to the amount of trade involved.

664. In other cases difficulties might arise from the divergence of the interests represented. Thus, in Australia it would not be easy for one officer properly to act on behalf both of United Kingdom and Canadian manufacturers of, say, agricultural implements and machinery. In such instances, the existence of divergent interests must be recognised, and separate Trade Commissioners are needed.

665. On the whole it appears not to be feasible to secure formal amalgamation or centralisation of the Commercial Intelligence Services of the Empire, which, besides the difficulties we have indicated in particular cases, would appear to involve considerable delays in the dissemination of information, but there is ample room for the fullest measure of friendly and semi-official co-operation between the existing organisations. Reports and information should be exchanged freely, and in certain places joint accommodation might usefully be arranged. There should also be periodic local conferences between the Trade Commissioners of the United Kingdom and the Dominions.

Consular Service.

666. In the past complaints have frequently been made that the Consular service was out of touch with

the needs of the mercantile community, but the Foreign Office in recent years has been endeavouring to meet this defect and has provided that the junior members of this service shall have had some weeks' attendance at the Commercial Intelligence Department of the Board of Trade before taking up their posts abroad; increasing importance is being attached to the commercial side of consular duties.* In our judgment, a considerable extension of this period of apprenticeship is desirable. A training of six months or a year in the Department of Commercial Intelligence should be regarded as essential before a Vice-Consul or Consul entering the service takes up his duties abroad. It is also desirable that before consular officers are appointed to posts in the United States they should spend, say, two months in working at the Department of Trade and Commerce, Ottawa. We would point out, however, that this brief preliminary training will be of little avail unless steps are taken to secure that adequate attention shall be paid to commercial matters during the subsequent career of Consular Officers.

667. We have already mentioned with approval the suggestion that a more extended system of trade representation should be established by Your Majesty's Government in foreign countries. The appointment of officers with duties analogous to those of the Trade Commissioners in the Dominions should provide a needed commercial stiffening to the Consular Service.

It is clearly desirable that opportunity should be given to the Governments of the self-governing Dominions to utilise the services of these officers in like manner as they now use the services of Consular Officers (*see* paragraph 669), and we suggest that Your Majesty's Government, in considering the arrangements to be made for the appointment and control of these officers, should bear this aspect of the matter in mind.

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* *See* p. 206 of [Cd. 7351].

668. The appointment of additional trade representatives in foreign countries would not, of course, wholly or, indeed, to any paramount degree, relieve the Consuls of their duties in relation to trade. We recognise that the functions of Consular Officers are by no means confined to commercial duties, but we fear that the latter have sometimes been relegated to a position subordinate to the official and representative functions which these officers are called on to perform. We would suggest, as an additional means of bringing the Consuls into touch with the commercial community, that Consular Officers in important trade centres should be required periodically to confer with commercial bodies and leading business men in the United Kingdom and the Dominions. Their leave would, of course, have to be extended for this purpose. We have suggested visits to the Dominions advisedly as, though a complete inter-Imperial trade intelligence system may be impossible, it is desirable that the commercial interests of the Empire should, as far as may be found practicable, be represented jointly in foreign countries. The possibility of trade competition between the Mother Country and any of the self-governing Dominions or between the Dominions *inter se* should not be allowed to interfere with the essential principle that in dealing with external States the Empire should be represented as one and indivisible.

669. Arrangements have already been made for partially utilising the Consular Service for the trade of the Dominions. Consular Officers are now authorised to give the same assistance to firms in the Dominions as to United Kingdom firms, subject to the consideration that the Consuls are primarily commissioned to serve the trade of the United Kingdom.

The Trade Commissioners of the Dominions are also entitled to apply to Consuls for assistance and advice.*

670. These arrangements might go further. In the first place Consuls might be instructed to furnish occasional reports on openings for Dominion trade similar to those (to which great importance is attached by the Home Authorities†) relating to openings for United Kingdom trade. For example, as was suggested to us in the Union of South Africa, enquiries might be made in the United States of America as to openings for fruit from South Africa, or in China and Japan as to the prospect of development of a trade in ostrich feathers.‡ Secondly, arrangements might be made to send to the competent Departments of the Dominions, or to their Trade Commissioners, information received from Consuls, Commercial Attachés and other sources abroad. Finally, Consuls in important centres might be instructed to pay periodic visits to the Dominions, as we have already suggested above.

671. In making the recommendation that the functions of the Consuls and other trade representatives in foreign countries should be extended so as to include a greater care over the commercial interests of parts of the Empire other than the United Kingdom, we are conscious that it may involve either some loss of service and increased expenditure on the part of the Mother Country, or some contribution from the oversea Dominions towards the cost of administration.

STATISTICS.

Existing Defects.

672. In the course of our inquiries, both in the United Kingdom and the oversea Dominions, we have

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* Smith, Q. 2522, pp. 164–5 of [Cd. 7351].

† *Id.*, Q. 2501, p. 162, of [Cd. 7351].

‡ O. Evans, Qs. 4411–2, p. 202; Pickstone, Q. 6607, p. 309 of [Cd. 7706].

frequently found difficulties owing to the absence of adequate statistical information. In some cases (*e.g.*, movement of capital) no official figures are available; in other cases, where official data are collected, they are either admittedly defective, or are compiled on bases which make effective comparison with similar figures for other parts of the Empire, either difficult or impossible. The subjects on which we regard the improvement of statistical methods and compilations most urgent are the following:—

(1) *Movement of Population.*—As we indicate elsewhere, we regard the question of migration from the United Kingdom to the Dominions as one of vital importance to the development of the Empire. A considered policy must be based on a careful examination of the volume and composition of the flow of migration in the past, and on careful scrutiny and measurement of the changes and fluctuations to which it is subject. In order more accurately to measure the outward movement from the Mother Country, the Board of Trade in 1912 instituted a new system of recording emigration and immigration, but these returns are not regarded as wholly trustworthy. In Australia the official figures as to migration are admittedly defective.* In New Zealand and South Africa the only figures available are those of the total number of passengers arriving and depart-by sea. In Canada statistics of immigrants (declared settlers) are recorded, but returns indicating the outward movement are partial and incomplete.

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* Weedon, Qs. 11,932 7, p 220: Knibbs, Qs. 12,223 8, p 241, of [Cd. 7172].

We have also found the view widely held that the present practice of taking a census at ten-yearly periods is insufficient in the case of countries such as Australia and Canada where estimates of population based on recorded migration, and on the excess of births over deaths, prove misleading unless checked by actual enumeration at relatively frequent intervals. Statistical authorities in Australia, in particular, favour a supplementary enumeration in every fifth year after the fuller and more elaborate decennial census.* In New Zealand census figures are now collected every five years, but so far as we know this is not the case in any other territory in the Empire. Many efforts have been made by the Royal Statistical Society and similar bodies in the United Kingdom to induce the authorities to provide for a quinquennial census on a limited scale, and such a census was recommended by a Committee as long ago as 1890,† but, so far, no result has been achieved.

In this connection we desire to call attention to the need for a preliminary re-enumeration of the population of the various parts of the Empire at a definite date, say six months or a year, after the conclusion of peace. So many vital problems, in particular that of migration, will depend for their solution on the possession of up-to-date figures of the changes which the War has effected in the distribution by age and sex of population within the Empire, that we regard it as urgent that a preliminary census should be undertaken without waiting for the collection of more elaborate statistics at the usual decennial census.

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* Knibbs, Qs. 12,084-6, p. 236; Johnson, Qs. 12,321-6, p. 246, of [Cd. 7172].

† [Cd. 6071]

(2) *Trade Statistics.*—In compiling the tables* which we submitted to Your Majesty, showing the recent development of the trade of the self-governing Dominions, we found many differences, both in form and substance, in the trade statistics of the United Kingdom and of the Dominions, which made a general survey difficult; in the Memorandum accompanying the tables we reviewed in detail the divergences existing, particularly in regard to (1) the periods for which the trade returns are compiled; (2) the method of recording countries of origin and destination; (3) the classification and nomenclature of imports and exports; and (4) the valuation of imports and exports. Various witnesses also pointed out the lack of uniformity and urged the need for unification and co-ordination of the trade statistics of the various parts of the Empire.†

We recognise that as the result of action by the Board of Trade and in pursuance of Resolution XIV. of the Colonial Conference of 1907‡ considerable progress has been made towards securing greater uniformity in the trade statistics of the Empire. We are aware, too, that differences in statistical method are in some cases the reflex of varying conditions and of divergent fiscal systems, and that the convenience of uniformity cannot outweigh considerations of more fundamental importance to the States concerned.[*] We are, however, of opinion that greater uniformity than at present exists could be attained without any considerable inconvenience to the revenue administration, or sacrifice of the utility of trade statistics for local requirements.

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* [Cd. 8156].

† Drage, pp. 347–8 of [Cd. 6517]; Pulsford, pp. 221–4; Knibbs, pp. 234–5, and Q. 12,068, p. 236; Tudor, pp. 243–4 of [Cd. 7172], &c.

‡ *See* [Cd. 5746–1], pp. 110, *ff.*, and Smith, p. 135 of [Cd. 7351].

(3) *Prices, Wages, and Cost of Living.*—Statistics of wages (actual and effective), and of the cost of living are of primary importance in dealing with problems of the distribution of population throughout the different parts of the Empire, and of the relative economic conditions in various countries. Local and independent inquiries into the cost of living have been undertaken by the Board of Trade in the United Kingdom, by the Commonwealth Statistical Bureau in Australia, by special commissions in New Zealand and Canada, and by the Economic Commission in the Union of South Africa, but so far as we are aware no adequate attempt has been made by competent official statistical authorities towards co-ordinated effort throughout the Empire in this direction.[†]

(4) *Movement of Capital.*—Evidence in New Zealand[‡] and Australia[§] showed that controversy and uncertainty existed as to the increase or decrease of investments of external capital in those Dominions, and as

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[*] *Cf.* Smith, p. 134 of [Cd. 7351].

[†] *Cf.* Drage, pp. 347–8 of [Cd. 6517]: Knibbs, pp. 229, 239 *ff.* of Cd. 7172].

[‡] Mabin, pp. 209, 213; Nathan, p. 214, Duthie, p. 215, &c., of [Cd. 7170].

[§] Nash, pp. 292–5; Knibbs, pp. 296–9, of [Cd. 7172].

to the interpretation of the figures of their "balance of trade." We recognise the difficulties, which were ably stated by the Permanent Secretary of the Board of Trade,* in the way of securing satisfactory official records of the movement of capital, but we consider that some attempt should be made by organised effort to overcome the entire absence of official information on this matter.

In making this recommendation we do not wish to depreciate the value of the compilations of various unofficial observers. We found, for example, in Canada that the figures collected by the "Monetary Times" of Toronto† as to investments of capital from abroad in the Dominion, had evidently been prepared with care and discrimination.

Proposed Conference of Statisticians.

673. We have indicated briefly several directions in which the statistical work now performed by various Government authorities both in the Mother Country and the Dominions appears to us capable of improvement, co-ordination, and expansion. There is an almost universal consensus of opinion among the various statistical authorities whom we have examined that progress towards uniformity could be most effectively and rapidly attained by means of a conference representing the Government departments in the different parts of the Empire which are now engaged in statistical work, and including officers of the various Customs administrations. We found that in Australia periodical conferences of the statistical officers of the Commonwealth and of the different States

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* Smith, p. 135 of [Cd. 7351].

† Field, p. 416 *ff.* of [Cd. 8458].

had proved to be of great advantage and had served to unify methods of collection, with the result that the various Australian statistical compilations, and notably the Official Year Book of the Commonwealth, form a remarkably complete statement of the economic position and progress of Australia. We understand that the Board of Trade in the United Kingdom are prepared, subject to the necessary Treasury sanction, to undertake the duty of convening a conference and preparing a programme of questions for discussion.* We recommend that this work should be undertaken immediately circumstances permit.

674. We have indicated above some of the defects in the statistical records of the Empire, which appear to be of importance, and we accordingly suggest that the agenda for the proposed conference should include the following matters amongst others:—

(*a*) methods of improving statistics of migration, and the possibility of co-operation between the Central Emigration Authority in the United Kingdom (the creation of which we have proposed elsewhere) and the corresponding departments in the Dominions in charge of immigration statistics, by such methods as the exchange at frequent intervals of information, in order to check records of arrivals and departures of migrants;

(*b*) the possibility of making quinquennial enumerations of population on a uniform basis, and the question of co-ordinating all census arrangements, whether quinquennial or decennial, so as to secure that enumeration takes place certainly in the same year, and, if possible, on the same day throughout the Empire;

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* Smith, Q. 2259, p. 141 of Cd. [7351].

(*c*) the unification and co-ordination of trade statistics. Adequate investigation of existing divergences, and consideration of their removal as far as possible, involve so much detailed work, that it might be well to delegate this subject to a special committee of the conference. Questions of statistical classificaton and valuation are also closely bound up with the administration of tariffs and tariff laws. and the suggested committee should therefore be strongly representative of the various Customs administrations. It has also been incidentally suggested* that a meeting of Customs officials of the Dominions would afford an opportunity for the discussion of the possibility of attaining greater uniformity in the form of various Customs documents which have to be furnished by merchants shipping goods to the Dominions.† In particular it should be possible to remove some of the small differences which now exist in the forms of certificate of origin required under inter-Imperial preferential tariffs.‡ In cases where essential differences of Customs administration or varying conditions are found to prevent the attainment of uniformity, the proposed conference could, in our opinion, do useful work by defining and explaining differences, with a view to an estimation of their approximate effect;

(*d*) the possibility of collecting by co-ordinated effort and on a uniform basis statistics of movements of capital, and figures as to prices, wages (actual and effective) and cost of living. Statistics as to prices should also include information as to the ruling rates of freight on the great ocean routes between different parts of the Empire;

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* Smith, Q. 2254, p. 141 of [Cd. 7351].

† *Cf.* p. 53 of [Cd. 7210].

‡ Tredwen, p. 37 of [Cd. 6517]; Johnston. Qs. 2356 *ff.*, p. 149 of [Cd. 7351], &c.

(*e*) the collection and preparation of agricultural, mineral, forest and fishery statistics on a common basis and in a uniform manner. The statistics on these subjects now available show such divergence of form as to render comparison of production an almost hopeless task.

675. It was suggested to us by more than one witness* that time would be saved, and the prospects of a successful issue improved, if before the conference either—

(*a*) each Government were asked to prepare a series of proposals for consideration, together with a comprehensive statement of existing statistics; or

(*b*) a single statistician were employed, possibly under the directions of a Committee of experts in London, to prepare a series of proposals which could be submitted to the various representatives for preliminary consideration in good time before the conference met.

We are of opinion that the adoption of either of these suggestions would facilitate matters, though we prefer the second. It would, no doubt, be most convenient that the selection of an officer for the preliminary work should be made by the Imperial Government.

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* Knibbs, p. 229 of [Cd. 7172]; Bowley, Q. 2148-50, p 131 and p. 203 of [Cd. 7351].

Imperial Statistical Office.

676. At the present time none of the administrations in the Empire is specially charged with the work of collecting, collating, and preparing statistics for the Empire as a whole, although the Board of Trade in the United Kingdom has for many years performed a useful duty in collecting and publishing particulars of this kind, especially in the "Statistical Abstract" and the "Statistical Tables" for the British self-governing Dominions, Crown Colonies and Protectorates, and more recently in the issue of the "Statistical Abstract for the British Empire." These publications are, however, prepared without the direct co-operation of the statistical departments outside the United Kingdom, that is to say, their form and contents are determined by the Board of Trade, which is alone responsible for the issue of the returns. The establishment of a central statistical office for the Empire has been advocated by several witnesses,* and we gather that the Board of Trade is disposed to favour the establishment of such a bureau which might take over the compilation of some of the statistics now prepared by that department.† We are of opinion that the creation of some office of the kind is eminently desirable.

677. We have already recommended that the duty of compiling data as to the relation between Empire production and Empire requirements of essential articles of commerce should be entrusted to an Imperial Development Board. The collection of particulars of this kind is largely statistical work and could readily be carried out by an Imperial Statistical Office working under the regulation and supervision of this Board.

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* Drage, p. 348 of [Cd. 6517]; Knibbs, p. 230 of [Cd. 7172]; Bowley, p. 128 of [Cd. 7351]; *see also* pp. 371–3 of [Cd. 8459].

† Smith, p. 136 of [Cd. 7351].

Publication of Monthly Trade Statistics of the Empire.

678. Dr. Bowley, of the University of London, placed before us, in some detail, a scheme for the publication early each month by a central statistical office of summaries of the trade of each part of the Empire up to the end of the preceding month.* He suggested that the value and quantity of the 40 principal articles of trade imported and exported to and from the 20 principal countries should be telegraphed to London from each Dominion, and expressed the view, in which we agree, that there would be no inherent difficulty in the publication of such returns, between the 5th and the 8th day of the succeeding month.

679. We believe that by the use of an appropriate code or by resort to cable letter the expense involved would be by no means prohibitive, and so far as early publication of statistics is concerned, we cordially concur in Dr. Bowley's view that speeding-up should be obtained at the expense of pedantic accuracy and verification of detail.† The monthly publication of summarised tables showing the commercial advance of the larger units of the British Empire would possess interest for the public, and would not be devoid of Imperial significance. We strongly recommend the adoption of the principle of Dr. Bowley's proposal. We suggest that its details should be discussed by the conference of statisticians suggested above, with a view to bringing the figures to be cabled within proportions which practical experience shows to be necessary.

EXHIBITIONS.

680. In more than one of our Interim Reports we have referred to the views expressed by various witnesses as to the value of Exhibitions in promoting trade. Here we propose to discuss briefly the various types of Exhibitions and their uses.

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* P. 128 *ff.* of [Cd. 7351].

† Bowley, p. 129 of [Cd. 7351].

Permanent Exhibitions.

681. Probably the best illustration of a permanent Exhibition is the Imperial Institute in London. Here permanent exhibits are kept and shown of the resources and products of all Your Majesty's Oversea Dominions. These exhibits should be of value, not only as a guide to those in search of new sources of supply of various products which they may require, but also to intending emigrants. If, however, the exhibits are to serve their purpose, it is essential that they should be constantly renewed, so as to present, at any time, an up-to-date record of the commercial progress and existing development of the different parts of the Empire.

Unfortunately the exhibits at the Imperial Institute, as we showed in Chapter VII. of this Report, are, with a few exceptions, such as those from Canada, sadly defective in this respect.

International Exhibitions.

682. In speaking of International Exhibitions, a clear distinction must be drawn between those of the "Universal" type, *i.e.*, those open to all branches of human activity, and Special Exhibitions, that is to say, Exhibitions devoted to one or more particular branches of industry.

683. As regards "Universal" Exhibitions, it is now generally recognised that, unless special care is taken, these degenerate merely into profit-making undertakings, and that the attention of visitors is diverted from the exhibits to side-shows and other forms of entertainment.

The objections, not only of merchants and manufacturers, but also of Governments, to take part in Exhibitions of this type were reviewed by a Committee which was appointed by Your Majesty's Government in 1906. The evidence taken by this Committee showed that this reluctance to exhibit was attributable in a large degree to the following causes: (1) frequency of Exhibitions; (2) attractiveness of side-shows; (3) high cost of maintenance on account of the length of time during which the Exhibitions were kept open; (4) indiscriminate issue, and consequent deterioration of the value, of awards. As a result of the work of this Committee, a special Department of the Board of Trade was formed in 1907 to supervise Exhibitions.

684. The general question of International Exhibitions was discussed at a Special International Conference held in Berlin in 1912 and a Convention was signed providing that "Universal" Exhibitions should not be held more often than once in three years, and that the inviting Government, or its duly accredited delegates, should undertake complete financial responsibility for them as well as their management.

685. The objections to which we have referred did not apply to Exhibitions devoted to particular branches of industry, in which British manufacturers are often glad to participate with a view to extending their markets. The Berlin Convention did not favour any special restrictions upon the holding of such Exhibitions.

686. We have no comments to make upon the present policy with regard to either of these types of Exhibition.

Inter-Imperial Exhibitions.

687. We found a general feeling, not only in the United Kingdom but also in the Dominions, that inter-Imperial Exhibitions were likely to have an increasing tendency to promote Imperial trade.

We were told by the Permanent Secretary to the Board of Trade, that, so far as that Department could judge, British manufacturers would welcome the opportunity of taking part in official, or officially recognised, Exhibitions held in various parts of the British Empire. Such Exhibitions, it was thought, should afford a valuable opportunity to British manufacturers of developing their trade in the growing markets of the Dominions. It was added that additional considerations which would weigh with them would be the comparative moderation of tariff duties, and the preferential treatment accorded in the Dominions to products of British origin, as well as the sentiment in favour of British goods which undoubtedly exists and which Imperial Exhibitions should themselves do much to stimulate.*

Similarly we found in the Dominions a number of witnesses who advocated the establishment of inter-Imperial Exhibitions on the ground that these would open up new and lucrative markets for products of all kinds whether raw or manufactured.†

688. We therefore recommend that, as soon as opportunity offers, measures should be taken to organise inter-Imperial Exhibitions in the various self-governing parts of the Empire. We think that they might be held, say, once in four years, and that the general principles of the Berlin Convention should be applied to them, *i.e.*, that responsibility for the finance and management of the Exhibition should be assumed by the Government of that part of the Empire in which the Exhibition is held.

National Exhibitions.

689. National Exhibitions are usually held annually and in buildings specially constructed and retained for the purpose. They are akin to International Exhibitions in that they often invite exhibits from all parts of the world. On the other hand, so far as those in the British Empire are concerned, they have features resembling inter-Imperial Exhibitions,

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* Smith, p. 126 of [Cd. 7351].

† London, p. 204 of [Cd. 7170], Wunderlich, p. 211 of [Cd. 7172].

i.e., they display national products, and would prefer to have exhibits from other parts of the Empire.

We have described the most outstanding example of this kind of Exhibition, viz., the Canadian National Exhibition at Toronto, in our Fifth Interim Report,* and have there recommended that a building should be erected by Your Majesty's Government at this Exhibition. We think that the Governments of the other Dominions might well follow suit in this respect, and that similar encouragement might be given to National Exhibitions in other parts of the Empire as soon as they have, by results, justified their existence in the same manner as has that at Toronto.

Exhibition of British Industries.

690. We may next mention the arrangements originated in 1915 by the Board of Trade, and since repeated annually, to hold exhibits of British industries in London, open only to traders and others interested, and not to the general public.

We have heard nothing but good as to the results of these Exhibitions and are glad to learn that proposals are under consideration for sending a collection of samples of British goods on tour through certain of the Dominions.

Exhibition of Goods competing with British and Dominion Manufactures.

691. Lastly, we may refer to a type of Exhibition which is of special interest at the present time. Even before the War, on various occasions, the Commercial Intelligence Department of the Board of Trade, with the assistance of the Trade Commissioners, had organised Exhibitions of samples of foreign goods competing with British goods in the Dominion markets. These Exhibitions were not open to the public, but

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* P. 54 of [Cd. 8457].

considerable value was attached to them by manufacturers and others.*

692. Since 1914 the Department has organised Exhibitions of enemy-made goods, which British manufacturers have been invited to attend. At provincial centres foremen of works and other operatives have been encouraged to visit the Exhibitions in order to see for themselves the classes of goods manufactured by enemy rivals and the prices at which they can be sold. These goods have also been exhibited at selected centres in Canada. We found in the Dominion that this last action was greatly appreciated by manufacturers in the cities in which they were shown, and it is clear that Government action in this direction, with a view to the assistance of manufacturers, is amply repaid by results.

693. A further development in the same direction has been the collection of a comprehensive set of foreign catalogues by the Board of Trade for inspection by British manufacturers. Arrangements are also in operation whereby catalogues of enemy firms may be lent to United Kingdom firms for detailed examination.†

694. Lastly we may mention that the Department of Trade and Commerce of Canada is establishing a commercial museum at Ottawa at which it is proposed to exhibit samples of goods consumed in outside countries of a kind which it is possible for the Dominion to supply. Information will be provided as to the prices at which such goods are sold in the country of consumption, the materials of which they are made, the routes and rates of transport, and such other statistical and commercial particulars as may be required to assist Canadian manufacturers.

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* Smith, p. 154 of [Cd. 7351].

† *See* [Cd. 8460].

CHAPTER XIII.—UNIFICATION OF LEGISLATION BEARING UPON TRADE.

695. At the Colonial Conference of 1907 a resolution was passed in the following terms:—

> "It is desirable that His Majesty's Government, after full consultation with the Dominions, should endeavour to provide such uniformity as may be practicable in the laws for the granting and protection of trade marks and patents."[*]

A similar resolution commending greater uniformity with regard to Company Laws was agreed to[†]; one concerning Copyright was discussed but not passed.[‡]

696. At the Imperial Conference of 1911 the same matters came up again, and the representatives had before them elaborate memoranda, prepared by the Board of Trade,[§] on all these subjects except Copyright, which had been dealt with by a Subsidiary Conference in 1909. A further resolution was passed as follows:—

> "That it is in the best interests of the Empire that there should be more uniformity throughout the centres and dependencies in the law of copyrights, patents, trade marks, companies."

697. The recent history of the result of Imperial interchange of ideas on matters of this kind, as indicated above, is reflected in the evidence laid before us.

Many witnesses have advocated uniformity in commercial laws, some in principle, others in detail.

The advantages of assimilation are clear, but the subject obviously lends itself to generalities; the difficulties are:—first to find any basis of agreement on detailed points; secondly, to carry out that agreement by uniform legislation.

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[*] [Cd. 3523] pp. 488-9.

[†] *Id.*, p. 491.

[‡] *Id.*, pp. 489-90.

[§] [Cd. 5746-1] pp. 140-204.

698. Our investigations have satisfied us on two matters.

First, it is idle for the Imperial Conference to attempt to deal, except by way of final ratification, with technical subjects of this kind; they should first be discussed by subsidiary conferences, or by the proposed Imperial Development Board assisted by *ad hoc* advisers drawn from the Mother Country and the different Dominions.

Secondly, the only practicable path to greater uniformity lies in the detailed discussion and examination of points on which there is at present divergence of legislation.

699. We take the first steps on this path by pointing out certain of the differences which exist.

Patent Law.

DIVERSITY OF PRESENT PRACTICE.

700.—(a) *Who may obtain Patents.*—In the United Kingdom anyone who imports an invention from abroad, provided that it is not in use in the United Kingdom, may obtain a patent, but any hardship that might arise from this provision is modified by the adherence of the United Kingdom to the International Convention for the protection of Industrial Property* under which an inventor in any country adhering to that Convention is allowed priority over other applicants during a period of one year from the date of his foreign patent. Australia and New Zealand expressly refuse protection to imported inventions. The United Kingdom and most of the Dominions admit to protection the assignee or legal representative of an inventor, but in Newfoundland only the assignee is given protection, and then subject to conditions.†

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* *See* [Cd. 5842].

† 4 Geo. V, Ch. 12.

(b) *Opposition to grant.*—There is divergence as to opposition to the grant of patents. Newfoundland provides no machinery for this. Canada allows opposition only in case of conflicting applications. In the United Kingdom, Australia, and the Union of South Africa,[*] there are many and different grounds, and in New Zealand there are no limitations to the grounds of opposition.

(c) *Life of Patent.*—In Canada the life of a patent is 18 years in the United Kingdom and all the other Dominions 14 years. The provisions for, and periods of, renewal differ widely.

(d) *Revocation for Non-working.*—In the United Kingdom a patent may be revoked after four years for non-working. This provision was complained of in evidence before us in London,[†] and the complaints were supported both in New Zealand[‡] and Australia.[‡] In Canada and Newfoundland a patent is void after two years if not worked, whilst Canada has also a provision under which a patent is voided if the patented article is imported into the Dominion by the patentee after the expiration of one year (subject to extension) from the date of its grant.[§] In Australia and New Zealand, if working is not satisfactory, the Court may by order allow a patent to be worked by others than the patentee but without revocation. In the Union of South Africa revocation in consequence of non-working is allowed after three years.

(e) *Compulsory Licences.*—The United Kingdom, Canada, Australia, New Zealand, and the Union of South Africa make provision for the grant of compulsory licences by the patentee if the competent

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[*] The law in force in the Union as to Patents. Designs. Trade Marks, and Copyright was recently consolidated, *see* Union Act, No. 9 of 1916.

[†] Carpmael, p. 182 of [Cd. 6517].

[‡] J. R. Park, Q. 3532. P. 223 of [Cd. 7170]. Waters, p. 323 of [Cd. 7172].

[§] Patent Act. R.S., 1906, Chapter 69, Section 38 (*b*).

Government authority is not satisfied with his working; Newfoundland makes no such provision.

(f) *Fees.*—Witnesses in the United Kingdom dwell strongly on the question of fees and the heavy cost of full protection. This cost was set down in 1912 at 289*l.*[*] for the United Kingdom and all the Dominions, but has since been reduced to 166*l.* by recent legislation in the Union of South Africa. Even so, the case is not so bad as these figures would make it appear, because the total sum is only payable when an inventor wishes to protect his invention throughout the self-governing parts of the Empire for the full life of the patent. What an inventor needs most is protection from the dangers of early publicity, and he can obtain provisional protection in the United Kingdom and all the Dominions for a much lower sum.

(g) *Uniformity in Specifications.* — The laws of Australia and New Zealand already resemble those of the Mother Country in essentials with regard both to provisional and complete specifications whilst the recent legislation of the Union of South Africa is also similar to that of the United Kingdom. Canada does not appear to contemplate provisional specifications, but allows the intending applicant for a patent who has not perfected his invention to file a description of his invention so far as it has proceeded and this filed document (called a " caveat ") gives him protection for one year. Newfoundland does not provide for provisional specification or caveat, but gives protection for six months from the date of delivery of specification.

SUGGESTIONS.

701. In view of the divergences between existing legislation, some of which, but by no means all, we have sketched above, and of the number of legislative

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[*] Wright, p. 288 of [Cd. 6517].

authorities amongst whom agreement would need to be sought, immediate uniformity seems impossible.

702. It has been suggested to us by witnesses that if an invention has been patented in any of the self-governing parts of the Empire, it should be patentable in all parts on payment of search fees, but the fees payable for full protection are now so low that there would be no practical gain in the adoption of this suggestion.

In the United Kingdom the renewal fees are heavy, but, as was pointed out to us in evidence, it is only reasonable that a patentee should pay more heavily for the continued right to exploit a market of 45 million persons than for that of exploiting the smaller markets of the Dominions.*

703. We do not think that the question of fees is one in which reform is most urgently required. There are others on which action is more needed, and also immediately practicable. These we may classify as follows:—

(1) The legislation now in force in Newfoundland is somewhat out of date and could be remodelled with advantage. We hope that the necessary steps may be taken.

(2) Efforts should be made to arrive at uniformity in the United Kingdom and all the Dominions with regard to compulsory licences and revocation for non-working.

In our judgment the Australian and New Zealand system, which we have described above, is the most satisfactory. This system should be combined with clauses for compulsory licences.

(3) Even without new legislation it should be possible to secure complete uniformity in

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* Wright, p. 288 of [Cd. 6517].

the Mother Country and the self-governing Dominions in regard to:—

(*a*) The forms that have to be filled in when a patent is applied for;

(*b*) the declaration to be appended to those forms;

(*c*) the specifications and drawings required;

(*d*) the amount of protection obtained by acceptance of provisional specifications.

Much useless expense and trouble would be saved by uniformity in these respects.*

(4) Legislation is desirable to secure uniform duration of patents.

Trade Marks.

DIVERSITY OF PRESENT PRACTICE.

704. The divergences which exist between the various laws in force regarding trade marks are not so serious as in the case of patents, but still serious enough.

(1) *Marks, Trade Marks and Registrable Trade Marks.*—The New Zealand Patents Designs and Trade Marks Act, No. 17 of 1911, and the Commonwealth of Australia Trade Marks Act, No. 19 of 1912, adopt the definitions of "mark," "trade mark," and "registrable trade mark" from the Imperial Act of 1905, and adopt also section 9 of that Act (which deals with the limitation of trade marks) so far as applicable. In the Act of 1912, Australia has further restricted the use of certain words and signs in trade marks. In the Union of South Africa the limitations of "registrable trade marks" also follow those in the Imperial Act of 1905, whilst the definitions of "mark" and "trade

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* *Cf.* J. R. Park, Q. 3539, p. 223 of [Cd. 7170].

mark " also follow those in that Act. In Canada there is no definition of a registrable trade mark, a wide discretion being left to the Minister. In Newfoundland the definition exists, but its wording does not follow the latest legislative model of the Mother Country.

(2) *Advertisement and Opposition.*—The United Kingdom and most of the Dominions make provision both for advertisement and opposition. Newfoundland and Canada do not recognise the necessity for either.

(3) *Duration of Registration.*—The usual duration is 14 years, but in Newfoundland and Canada (except in the case of "specific" trade marks*), the period is unlimited.

SUGGESTIONS.

705. In Canada and Newfoundland attention might usefully be paid to making the requirements of the law more uniform with those of the Mother Country and other Dominions.

In particular the following reforms are most urgent:—

(1) Identity in the definition of a registrable trade mark. This would involve an alteration in Canadian legislation and more up-to-date legislation in Newfoundland.

(2) Establishment of an inter-Imperial arrangement (as suggested in the evidence tendered to us by the Birmingham Chamber of Commerce†), based upon the fundamental principle of prior user which would protect a mark registered in one part of the Empire in every other part without costly duplication of fees.

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* A specific trade mark is defined as a "Trade mark used in connection with the sale of a class merchandise of a particular description." Trade Mark and Design Act, R.S., 1906 chapter 71, section 4.

† Wright, p. 288 of [Cd. 6517].

Such an arrangement would necessitate some considerable alteration of the laws of Canada and Newfoundland, but not of those of the United Kingdom, Australia, New Zealand, or the Union of South Africa.

We understand that the Union of South Africa contemplates adherence to the Washington Convention for the Protection of Industrial Property, which provides, in respect both of patents and trade marks, a certain priority for purposes of registration. The United Kingdom, Australia, and New Zealand are already parties to this Convention.

Company Law.

DIVERSITY OF PRESENT PRACTICE.

706. The position as regards Company Law is perhaps the most perplexing of all. There are at present in the United Kingdom and the self-governing Dominions more than 20 authorities empowered by law to legislate in respect of companies, and the legislation thus brought into existence is contained in considerably over 100 statutes and ordinances.

With this number of legislative bodies and legislative enactments there must be considerable diversity.

That the present state of affairs is a great hindrance to trade is undoubted. A marked subject of complaint amongst the witnesses who gave evidence before us was the exercise in certain cases by the various legislative bodies of their right to impose differential taxation on joint stock companies.

SUGGESTIONS.

707. We venture to indicate, as in the case of patents and trade marks, the steps which seem most immediately needed in order to improve the present position of affairs.

(1) Amongst those divisions of the Empire which have consolidated their law in recent years, it is noticeable that the legislation in force in the United Kingdom with regard to companies has been followed fairly closely.

Consolidation, if carried out in all cases, would remove some of the inconveniences of which complaint is made. Without setting up the United Kingdom legislation as an ideal, we may suggest that, as this has been accepted in principle and with close approximation in detail by some of the Dominions, and as a standard has therefore been set up, it would be advisable to follow that standard as closely as possible where consolidation is undertaken.

(2) One of the ideas dominant in the formation of a joint stock company is often that of trading over a wide area. The extension of modern commerce has made such organisations almost a necessity, and, so far as is consistent with public control and the maintenance of public policy in each self-governing Dominion, companies formed within the Empire should have the widest possible range. The proposal made to us that joint stock companies formed within the Empire should have the right to trade in any part of the Empire on payment of a registration fee, is perhaps a counsel of perfection and not consistent with the control of their internal affairs by the Dominions. But it is not too much to suggest that trading companies formed within a self-governing Dominion should be unhampered by divergent legislation within that Dominion. At present the Union of South Africa has the power to legislate for joint stock companies, but leaves that power in the hands of the Provinces, one of which (Natal) imposes a special tax on outside companies. The Dominion Government of Canada may legislate for and create companies, and the Provinces also have jurisdiction with regard to the incorporation

and powers of companies.* The Provinces also claim the right to differentiate between domestic and outside corporations, and certain Provinces have exercised it in the imposition of special taxes and licence fees.† In Australia the Commonwealth Government may not create joint stock companies to trade in the States, but may control them to some extent if they trade in more than one State. Under existing trade conditions it seems axiomatic that the creation and control of those bodies should be in the hands of each central Government.

(3) Apart from the general question of creation and control, there is the matter of differential taxation of trading companies as distinguished from private firms or individuals. The exercise of this right for the purpose of carrying out some line of policy is comprehensible, but the special taxation of trading companies formed within the Empire as contrasted with private firms and individuals is hardly consistent with the encouragement of Imperial trade.

Double Income Tax.

708. Double income tax is one of those questions on which much has been said and little accomplished during the last 10 years. It was discussed at the Colonial Conference of 1907, and again at the Imperial Conference of 1911, without result.

Witnesses before us have taken up the question in various forms—particularly with reference to legislation passed in New Zealand, in Queensland and in Western Australia.‡

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* Falconbridge, p. 427 of [Cd. 8459].

† *See* British Columbia Act, No. 12 of 1914; New Brunswick Act, 5 Geo. V., ch. 7; Prince Edward Island Act, 5 Geo. V., ch. 4.

‡ *See* Symonds, p. 60 of [Cd. 6517], Dawson, p. 228 of [Cd. 7170] H. Johnson, p. 320 of [Cd. 7172].

709. We draw attention to the view expressed by the Lords Commissioners of Your Majesty's Treasury in a letter which was laid before the Imperial Conference of 1911,[*] that there is nothing inequitable in the requirement that a person who resides in one country and earns his income in another should be made amenable to the taxation of both.

For some time this view held the field.

710. Recently, however, the pressure of War taxation has resulted in some modification of opinion, and relief to the taxpayer. We notice, for example, that in the Imperial Finance Act of 1916[†] relief is given in respect of income subjected to a higher rate than 3*s*. 6*d*. in the United Kingdom which is also subject to Colonial income tax. The same principle is adopted in the Business Profits War Tax law recently passed by the Dominion of Canada,[‡] and also in New Zealand legislation.

We are of opinion that these precedents will be of value later on, though, in present circumstances, nothing would be gained by putting forward detailed suggestions for further altering the present situation.

Currency and Coinage Laws.

711. We have studied the discussion on the subject of currency and coinage laws at the Imperial Conference of 1911, and have also heard evidence from the representatives of the Decimal Association[§] and from witnesses in the Dominions as to the desirability of introducing metrical weights and measures and a new style of coinage based on the decimal system.

The general advantages of these systems are recognised; the complications of the present arrangements, both in the United Kingdom and in several of the Dominions, are such that few would undertake to defend their principles.

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[*] [Cd. 5746-1], pp. 266-7.

[†] 6 & 7 Geo. V., ch. 24.

[‡] 6 & 7 Geo. V., ch. 11.

[§] Pp. 162-168 of [Cd. 6517].

712. Many of the Dominions, recognizing this, have passed resolutions in Parliament, or even permissive legislation, in favour of the decimal and metric systems. There is clearly in the Dominions a considerable body of opinion in favour of this change. So far, however, all efforts to induce the community in the Mother Country to agree to a change have proved unavailing. We understand that the United Kingdom Committee on Commercial and Industrial Policy is now examining the subject.

713. We are of opinion that the termination of the war will bring with it an unequalled opportunity for securing this much needed reform, and we recommend that Your Majesty's Government and the Governments of the oversea Dominions should then co-operate to establish throughout the Empire a uniform coinage based on the decimal system and uniform weights and measures based on the metric system.

CHAPTER XIV.—EMPIRE DEVELOPMENT AND ORGANISATION.

714. During the whole course of our investigations into the resources and development of the self-governing Dominions and their economic relations to the United Kingdom and the world, we have been conscious of two strong and impelling impressions.

First, for Empire purposes, no survey can be complete without including India, the Crown Colonies and the Protectorates. In themselves, and even as now developed, they form too vital and important a part of the Empire to be left out of present calculations. But it is plainly evident that their potentialities, measured by any fair standard, are immense, and that their future contributions to the Empire's strength and greatness will far surpass those of the past. These parts of Your Majesty's oversea possessions are vitally linked with the self-governing Dominions: the destinies of all are interwoven.

Secondly, we have been equally strongly impressed by the almost infinite variety of the Empire domain, the extent of its area, the inequality of distribution of its population, and the disconnected character of its governing and directing machinery.

The British Empire has grown in obedience to no matured plan of development. Each section outside the United Kingdom which has received the grant of self-government has shaped its own course, pursued its own ends, and has directed its activities chiefly from the standpoint of its local interests. One sentiment alone has held the widely scattered parts from disintegration, loyalty to the Crown and the Mother Country accompanied by a reassuring sense of security and protection.

Yet, as growth has proceeded and as strength and power of the outlying portions of the Empire have increased, as means of communication and intercourse have multiplied, there has developed a deepening sense of common aims and ideals and recognition of common interests and purpose. The instinct, not only of nationhood, but of Imperial unity has gradually asserted itself. Communities have been enlarged, sections have coalesced, confederations have been established. Strength has succeeded to weakness, method has grasped the reins of chance. The scattered stones of early colonial days have been built into noble national structures. Already the stately outlines of the Empire of the future can be discerned against the far horizon.

In the self-governing parts of the Empire the burden of legislators and administrators is heavy and exacting. Local interests are pressing, and when these are served there is little time or energy left for considering broader and wider interests. Whilst now and then an inspiration to common action is laboriously realised, most ideas languish under the lack of the needed mechanism, and are ultimately buried amongst the neglected opportunities of the world. In the other parts of the Empire ingenuity to devise and power to fulfil are seldom found in conjunction, whilst the tedious procedure necessary precludes speedy attainment.

So in both these divisions of the Empire golden opportunities for concerted effort are continuously being lost, and in every part of the vast estate fields of richest promise lie fallow. The tasks which, if undertaken, would result in vastly increased wealth and multiplied man-power remain unattempted.

With political institutions we have not here to deal. But with the better utilisation of the resources of the Empire and the improvement of its economic relations, our mission is intimately connected.

We therefore desire to submit to Your Majesty the conclusions which we have formed as to the development of the Empire's resources and the furtherance of its trade by the concerted action of all component parts of Your Majesty's Possessions.

Existing Deficiencies.

715. It will have become apparent from the foregoing Chapters of this Report that joint organisation has so far made little effective progress.

Occasional realisation of the advantages to be derived from correlated action has resulted in joint subsidies to inter-Colonial and inter-Imperial steamship services, in joint construction and operation of cable lines, in co-operation for the establishment of trade and commercial intelligence agencies, and in the wide system of Empire trade preferences established by the Oversea Dominions.

No official attempt, however, has yet been made, except partially by the appointment of the Dominions Royal Commission, to consider questions affecting Imperial trade and development, from the point of view of the interests of the whole Empire.

716. In the course of our journeys we have been impressed with the inadequacy of existing organisations to deal, promptly and efficiently, with the following matters:—

(1) Telegraph, cable and shipping communications between the various portions of the Empire.
(2) Inter-Imperial Mail Services and postal rates.
(3) The development of Harbours and Waterways on the great routes of commerce to meet Imperial requirements.
(4) Migration as a factor in Empire Development and Trade.
(5) Legislation affecting the mechanism of trade, such as that on patents, companies, copyright, weights and measures, &c.
(6) The application and better utilisation of capital raised in the United Kingdom and other parts of the Empire towards promoting the development of the Empire's resources.
(7) The systematic dissemination throughout the Empire of news bearing upon Imperial questions and interests.
(8) The preparation and publication of Imperial statistics.
(9) Better organisation for handling and for disposal of the produce of various parts of the Empire.

Again the experiences of the War have fully demonstrated the need for, and the benefit of, close co-operation not only for defence but for conomic purposes, and means have been improvised for attaining the desired object. As we have shown, however, in Chapters VI. and VII. of this Report, there is urgent need for the creation of some Imperial Body which shall collect information, and advise the different Governments, as to the requirements of the Empire in respect of all raw materials and commodities essential to its trade, and shall watch carefully any tendencies towards change.

717. In each of the above cases machinery is now lacking for efficient examination and for the adjustment and co-ordination of interests in pursuance of the general advantage and wider development. Even where local Governments enter into negotiations with one another or with some other country, they naturally incline to take a private and particular view, and seek to obtain the best terms for the interests they represent, without regard to a broader and more statesmanlike survey of the whole position.

718. Periodic conferences between technical and other officers of the various Governments have no doubt achieved and can achieve a great deal. Opportunities for reform and for joint action result from discussions between postal authorities of the Mother Country and the self-governing Dominions. Similarly, harbour authorities might draw up from time to time schemes of harbour deepening and improvements on a uniform basis. Statisticians could co-ordinate and unify returns, whilst representatives of the Agricultural departments could draw up rules for the quarantining and testing of stock, and for the elimination and exclusion of pests.

719. Difficulties, however, are constantly arising as to the point at which inter-Imperial discussion becomes needed, as to the place and time at which it is to be held, as to the convening authority, and as to the programme to be submitted and discussed. We believe that the time has come when something less

occasional is needed, when a body should be created which could be referred to at any time and by any of the Governments in order to smooth the path of Imperial development. There is, in brief, both scope and need for a new Imperial Development Board which, without displacing any existing body, would devote its energies and experience to a continuous survey and consideration of Empire resources and opportunities, and to study of the best means of co-ordinating Empire effort for the development of these resources, for the extension of Imperial trade, and for the strengthening of Imperial lines of communication. It would be impossible to exaggerate the significance and influence of such a Board, composed, as it should be, of men possessing an intimate knowledge of the Empire and its resources, in constant consultation and collaboration, on the watch for every opportunity, and alive to every possibility.

Sphere of a New Organisation.

720. In order to indicate the scope of the labours of this new Board, we cannot do better than refer to the preceding paragraphs and state that the matters enumerated in paragraph 716 would, with those of a similar nature, form the particular subjects which could wisely be assigned to the new organisation as its ordinary work. To the duty of advising and guiding on these matters would, of course, be added that of collecting the necessary particulars bearing upon them. This would involve research not only into the conditions prevailing in the Empire but into the methods of production and distribution of rival trading countries which have similar problems to face. Accurate and up-to-date knowledge of such matters will be, in our judgment, necessary and indeed vital under the keener competition and closer organisation which will obtain after the war. We have already suggested (*see* Chapter XII. of this Report) that the time has now

come when the function of preparing and publishing such statistics as are of use to the Empire as a whole should be handed over to some body which does not represent, and is not paid by, a single part only.

721. The proposed Board should further undertake the elaboration and the critical examination of joint Imperial schemes of development.

Under present conditions any schemes of this nature obtain necessarily only a brief discussion at Imperial Conferences, and are ape to reappear upon the scene four years later only to be subjected to a similar process. The delay which elapsed between the initiation of the Pacific Cable scheme and its practical realisation is an example of the dilatoriness of present methods. The institution of the Imperial Conference has not sensibly quickened the methods previously obtaining in respect of Imperial schemes.

The submission of questions of joint development to an Imperial Board would save both time and money. It would save time by the curtailment of the interminable negotiations which are now required to achieve joint action between the various Governments. It would save money in the sense that the schemes submitted to it would receive thorough examination and would pass through the fire of criticism.

722. The primary condition of this new Imperial Development Board must be that it should not encroach upon the political or administrative machinery of any of the self-governing parts of the Empire.

In other words it should be purely advisory in its initial stage. We are not prepared to suggest that at its inception any specific administrative functions should be assigned to it, but equally we hesitate to restrict the future activities of a new, and to some extent experimental, organisation. If at some future time the Governments of the Empire should, either through the Imperial Conference or otherwise, desire to delegate any administrative duties to it we see no inherent difficulty in giving effect to such a wish. It might, for example, be considered desirable that the Board should undertake, either directly or by means of special committees, the working of joint services such as the Pacific Cable.

Advantages of a Permanent Body.

723. We proceed to examine some of the objections which may be brought against the creation of a permanent Imperial Board such as that which we have outlined.

724. First, it may be argued that its institution will not sensibly decrease the great waste of time which has always occurred in the past, when co-operation is needed between self-governing communities. Also it may be pointed out that uniform action even in the self-governing parts of the Empire only results in the last resort from a tedious and complicated process, involving legislative and administrative action by six Governments at least, and possibly many more.

This argument touches the very foundation of the constitution alike of the United Kingdom and the Dominions. Difficulties of legislation and administration could not be avoided without a fundamental change in existing institutions, and the establishment of a single authority representative of, and responsible to, the Empire as a whole. Into this great question we do not feel that it lies within our province to enter. We would, however, point out that the argument does not invalidate, but rather strengthens the case for immediate improvement in the practical working of the Empire's machinery. It points, in our judgment, to the urgency of the need for the creation of a new body which will seek to adjust differences, to remove causes of delay, and so smooth the path to speedy and effective action.

725. Secondly, it may be urged that Mr. Lyttelton's proposals, in 1905, for the creation of an Imperial Commission,[*] and, again, those put forward by Mr. Harcourt at the Imperial Conference of 1911 for the appointment of a Standing Committee of the Conference,[†] met with considerable opposition and were abandoned. Will not then the present proposal meet with similar objections, and a similar fate? To this we reply that in 1905, and even in 1911, the urgency of promoting Imperial development on scientific lines was but dimly realised, if realised at all. Since the Imperial Conference of 1911 the whole conception of inter-Imperial relations has altered, and the need for co-operation between the Governments in such matters as the development of their resources and the best distribution of their population has been brought into the strongest relief.

In our view, the new Board would be of the greatest assistance to the Imperial Conference, or such other Imperial machinery as may be created in the future. Criticism of the existing system is too easy to be of interest, but, surveying the whole question, it is impossible not to be impressed with the inadequacy of the examination which the Imperial Conference is now able to devote to any particular problem, and the consequent need for a body representing all parts of the Empire, which shall number among its functions the study of the intervals between Conferences of matters referred to it, as well as the elaboration at leisure of fresh schemes of Imperial importance.

726. Thirdly, it may be contended that a new Imperial Board, even with advisory functions only, might limit the freedom of action of Your Majesty's Government, and the Oversea Governments. We answer that such apprehensions would have no solid

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[*] [Cd. 2785].

[†] [Cd. 5745] pp. 76-95 and 173-193.

foundation in regard to the organisation which we have suggested. It must not be in any sense political. Its functions would be confined exclusively to matters affecting the machinery of Imperial trade and development. It could not interfere with the policy of the Empire or of any part of it. Its duty would be to procure information and give advice on questions of development and trade, either on its own initiative, or as the result of a specific reference by the Imperial Conference or by one or more of the participating Governments.

727. Lastly, it may be thought that duties of the nature which we have indicated could best be delegated to special *ad hoc* Committees or Commissions and that there is no need to create a permanent organisation to deal with such cases as may arise. We venture to express an unqualified preference for the discharge of the proposed functions by a permanent organisation with continuity of action and traditions rather than by Special Committees whose action must be necessarily spasmodic and whose appointment might well take longer than the full investigation of a given subject by the proposed body. We would also point out that a body representative of all parts of the Empire, which starts on the investigation of matters of development and trade equipped with a knowledge of Imperial affairs obtained by current work, would be better qualified than an *ad hoc* Commission whose members have necessarily to crowd their examination of general conditions into the brief duration of their special mission. If it is urged that an *ad hoc* Commission would have better technical and scientific equipment than the members of a Board selected on general grounds, we may reply that technical advice can always be invited and indeed is essential in practically every case. Technical and scientific assessors on special subjects can be brought in to assist the permanent Board on points outside its general competence.

Constitution of new Organisation.

728. It may be argued that it would be wise to confine the new functions of which we have been speaking to representatives of the United Kingdom and of the self-governing Dominions. We reply that such limitation is illogical and impracticable. Some general reasons for this view have been already indicated. Others of a more concrete nature may be adduced.

The depths of harbours of the Mother Country and the Dominions cannot, as we have shown, be co-ordinated to meet Imperial requirements without reference to those of India and of certain Crown Colonies. Cable problems similarly affect British possessions other than the Dominions. The deepening of the Suez Canal is of obvious interest to India, Ceylon, and the Eastern Colonies, as well as to Australia and New Zealand. Imperial statistics would lose much of their value if confined to the United Kingdom and the Dominions.

More important than all, a survey of the present and future requirements of the Empire in the way of raw materials, and the relation of requirements to production, could not with advantage be undertaken unless this survey included all parts of the Empire and was performed by a body representing the whole.

729. We recommend, therefore, that the new Imperial Development Board, whose creation we propose, whilst including representatives of the United Kingdom and all the Dominions, should also number among its members representatives of India, the Crown Colonies and the Protectorates.

730. In our view its numbers should be kept as low as possible, with a view to increasing efficiency, and its members should be required to give their whole time

to the work. Representation of the various parts of the Empire might be on the following lines:—

United Kingdom, India, Crown Colonies and Protectorates	7
Canada	1
Australia	1
New Zealand	1
Union of South Africa	1
Newfoundland	1
	12

731. As to its expenses, their division amongst the constituent parts of the Empire in proportion either to trade or revenue would seem to be an equitable arrangement, and it should not be impossible to give the Imperial Treasury the immediate supervision of its finances, subject to adjustment with the other parts of the Empire at the close of each financial year.

732. We would venture to suggest further that every precaution should be taken against stagnation by limiting the period for which the representatives are to serve.

733. Whilst headquarters would be in London, it should be a distinct part of the duties of the proposed Board to make journeys from time to time in the Empire with a view to the examination of special problems, and it might on other occasions delegate either a sub-committee or an officer of its selection to report upon a particular problem overseas.

Summary.

734. To sum up, we advocate the creation of an Imperial Development Board advisory in its initial stage, and representing all parts of Your Majesty's possessions, which shall take into consideration, and advise the different Governments on matters affecting the development of the natural resources and trade of the Empire. This Board, in our view, should be

appointed by Your Majesty and should work under the supreme control of the Imperial Conference. Its main functions would be—

(*a*) to continue, complete and thereafter keep up to date the survey begun by us of the relation between the production and requirements of the Empire in the matter of food supplies, raw materials and all other commodities essential to its well-being;

(*b*) to watch and report upon the changing requirements of the Empire in respect of such materials and commodities, and to mature plans for promoting and improving their production within the Empire:

(*c*) to investigate in collaboration with existing institutions and committees for scientific research—

(1) the possibilities of production within the Empire of such of these essential materials and commodities as now are, or may in the future be found to be, mainly produced and controlled outside its limits, as well as the possibilities of new supplies generally;

(2) the best means of promoting efficiency and preventing waste in existing methods of production;

(3) the possibilities of the utilisation of substitutes for essential commodities which are not found to be available within the Empire;

(*d*) to consider and devise means for the direction of Empire capital towards the development of Empire resources;

(*e*) to study the larger aspects of migration within the Empire with a view to securing and maintaining a sufficiency of population in all its parts;

(*f*) to advise on the adequacy for Imperial requirements of schemes of harbour improvement in certain of the great ports within the Empire;

(*g*) to study lines of communication by steamship, cable, or railway which are contributory and necessary to Imperial development;

(*h*) to study and report upon legislation affecting the mechanism of trade in its widest sense, and to keep in touch with development in similar legislation throughout the world;

(*i*) to prepare and publish Imperial statistics.

CHAPTER XV.—CONCLUSIONS AND RECOMMENDATIONS.

735. It now remains for us to set out briefly the main Conclusions and Recommendations which we desire to bring to the notice of Your Majesty's Government and the Dominion Governments. They are as follows:—

(i) SCIENTIFIC DEVELOPMENT OF NATURAL RESOURCES.

Lines of Future Development.

(1) It is vital that the Empire should, as far as possible, be placed in a position which would enable it to resist any pressure which a foreign Power or group of Powers could exercise in time of peace or war in virtue of a control of raw materials and commodities essential to its well-being (para. 328).

(2) A complete survey should, accordingly, be made of the relation between Empire production and Empire requirements of such materials and commodities. We have ourselves collected and now present preliminary facts and figures for such a survey (paras. 329–30 and Appendix I.).

(3) The results of a complete survey would divide essential raw materials and commodities into three categories:—

(*a*) Materials of which the world's requirements are mainly or wholly produced within the Empire.

(*b*) Materials of which the Empire's requirements are approximately equalled by Empire production.

(*c*) Materials of which the world's requirements, and with them those of the Empire, are mainly produced and controlled outside the Empire (paras. 331–2).

(4) Materials within the first of these categories, instances of which are nickel, asbestos, and jute, form for the Empire a valuable means of economic defence and commercial negotiation (paras. 334–5).

(5) Examples of materials comprised within the second of these categories are wheat, butter, cheese, and wool. We suggest certain general lines of action in order to promote the exchange of such articles within the Empire. In certain cases falling within this category, instances of which are zinc, tungsten, and monazite, we indicate special action in order to secure the control and utilisation of Imperial supplies for the Empire's use (paras. 338-51).

(6) Most careful enquiry is needed in regard to materials included in the third category, instances of which are cotton, petroleum, nitrates, and potash. In particular the following lines of investigation are suggested:—

(*a*) The possibility of new sources of supply within the Empire.

(*b*) The possibility of finding substitutes within the Empire.

(paras. 352–68).

Means of preventing waste in existing sources of supply of all minerals should also be investigated (para. 355).

(7) The responsibility for a survey and investigations on the lines indicated above should be entrusted, together with other functions which we describe below, to a new Imperial Development Board (paras. 332, 354, 370–72).

(8) This Board should carry out the research work required for this survey and these investigations in the following manner:—

(*a*) In respect of the United Kingdom, through the recently formed Department for Scientific and Industrial Research, the National Physical Laboratory at Teddington, &c.

(*b*) In respect of the self-governing Dominions, through the now existing scientific departments, and the Committees for Research which are being set up in the Dominions.

(*c*) In respect of India, the Crown Colonies and the Protectorates through the local scientific departments and the Imperial Institute.

(para. 412).

Imperial Institute.

(9) We have refrained from suggesting that the Imperial Institute should be used for research work for the self-governing Dominions in connection with the above scheme, as we are of opinion that the best organisation for the future would be that the Dominions should concentrate their efforts on the development of their own research institutions, and that the research functions of the Institute should be limited to work for India, the Crown Colonies, and the Protectorates (paras. 392–404 and 411).

(10) We suggest that the responsibility for the exhibits now shown in the galleries of the Institute should be entrusted to the Royal Colonial Institute (para. 407).

(ii) MIGRATION.

(11) The method in which statistics of migration have been collected in the past, both in the United Kingdom and the Dominions, is unsatisfactory. Such figures as are available must be studied with special reference to the sex, the age-groups, and the occupations from which emigrants are drawn, and not with reference merely to gross numbers. This study is urgently necessary as a condition precedent in order to enable Your Majesty's Government and the Dominion Governments to deal scientifically with the problems of migration which will arise after the War (paras. 422–41).

(12) A far greater measure of control by Your Majesty's Government over the agencies in the United Kingdom for the selection of emigrants is needed than has existed in the past. In particular close supervision is required of passage brokers and passage brokers' agents and, as a corollary, of emigration societies. In order to effect such supervision the creation of a Central Emigration Authority under the control of Your Majesty's Government is necessary. Further, in order to effect proper correlation between this body and the activities of the Dominions in connection with migration, a Consultative Board to the Central Emigration Authority should be established on which representatives of the Oversea Governments and others should sit (paras. 442–64).

(13) Certain conclusions are put forward on the question of land settlement for ex-soldiers and their families after the War. In particular we emphasise the need for the provision of adequate capital, training, and assistance for the intending soldier settler (para. 467).

(14) The causes which have led to the existence of a surplus of women in the United Kingdom, and a corresponding deficiency in the Dominions, are analysed in some detail. Some leading phases of the problems which arise from the existence of such surplus and deficiency are indicated. We urge that, in future, as a matter of Imperial policy, far greater attention should be devoted to the emigration of women from the United Kingdom, and make various practical suggestions for increasing such emigration.

So far as the Dominions are concerned the fact is emphasised that one of their main problems lies in finding means to secure proper distribution of women throughout the country districts, and in preventing their concentration in the larger towns and cities (paras. 468–82).

(15) Much advantage is to be derived from the emigration of children now under the care of the State in the United Kingdom; suggestions are made for increasing and improving the methods of such emigration (paras. 483–508).

(16) Steps should be taken to secure—

- (*a*) uniform regulations for the admission of migrants from the United Kingdom into the British Dominions; and
- (*b*) that intending migrants should be able to satisfy themselves before leaving the Mother Country that they will be allowed to enter the Dominion of their choice.

(paras. 509–11).

(17) We do not advocate any more formal co-operation at present between the Employment Exchanges in the United Kingdom and the Dominion Governments (paras. 512–15).

(18) A scheme is outlined for the interchange of school teachers between the United Kingdom and the Dominions in order to secure for the rising generation in all the self-governing parts of the Empire fuller

acquaintance with conditions overseas and in the United Kingdom than that which now exists (paras. 516–23).

(iii) IMPERIAL COMMUNICATIONS.

Harbours.

(19) Cheap, speedy, and efficient transport between all parts of the Empire is a vital necessity for the scientific development of Imperial trade. Transport of this nature cannot be obtained except by the use of vessels of great length and draught (paras. 524–8).

(20) Such vessels cannot be employed unless there exist harbours of a size, and particularly of a depth, adequate to receive them. The development of the harbours and their approaches on the great trade routes of the Empire on an adequate and co-ordinated scale is therefore essential and urgent.

We put forward detailed suggestions for securing uniform depth on the chief ports of the various routes, with a view to securing accommodation for vessels of the following draughts:—

- (*a*) 33 feet on the route from the United Kingdom *viâ* the Suez Canal to the East and Australia;
- (*b*) 34 feet on the route from Western Canada to New Zealand and Australia;
- (*c*) 38 feet on the routes from the United Kingdom;
    - (1) to Eastern Canada;
    - (2) to Australia and New Zealand *viâ* the Union of South Africa;
    - (3) to New Zealand and Australia *viâ* Halifax, Jamaica and the Panama Canal.

The expenditure required to carry out these improvements would not exceed that of building a few hundred miles of railway, whilst the benefit to the Empire would be incommensurably greater (paras. 529–59).

(21) In order to secure uniform progress in the future we recommend:—

(*a*) That all schemes of improvement for certain scheduled ports and dry-docks on the great trade routes of the Empire should be submitted to the proposed new Imperial Development Board, so that whilst not interfering in any way with details of construction, &c., it may advise on these schemes from the standpoint of Imperial requirements.

(*b*) That where enlargement of any scheduled port or dry-dock, which is not in Government ownership, involves expenditure in excess of that which local requirements would demand, the Government concerned should assist in providing the necessary additional capital and interest charges.

(*c*) That an Imperial representative or representatives should be added to the governing bodies of those ports in the United Kingdom which are scheduled in accordance with the scheme outlined above (paras. 560-3).

Shipping Communications.

(22) Hitherto the important mail contracts of the Empire have never been arranged in such a way as to render possible periodical review of the policy of the Empire as a whole in regard to its sea communications (para. 571).

(23) Further, the principle that speedy transport at an economical cost can only be obtained by the employment of vessels of great length and draught has never been sufficiently recognised throughout the Empire (paras. 564-66).

(24) Opportunity should arise shortly to remedy both of these defects. First, it is possible so to arrange matters that new Imperial services can be initiated in 1922 when the latest of the existing mail contracts expires. Secondly, in the interval, Your Majesty's Government and the Dominion Governments could arrange in concert to deepen selected ports on the great Imperial trade routes to accommodate vessels of the length and draught required to secure high speed at reasonable cost. We strongly recommend that both these measures should be taken (para. 571).

(25) The way will then be clear for the development of new mail services of high speed by other routes than that now utilized, for conveyance of the mails from the United Kingdom to Australia and New Zealand, and for improving also the communications between the Mother Country and other parts of the self-governing Dominions, and between the Dominions themselves. Detailed tables of distances and times for the proposed new services to Australia and New Zealand are given. The first is *viâ* Canada and the Pacific, the second *viâ* the Union of South Africa (paras. 571–3).

(26) We are also in favour of development of the route from the United Kingdom to New Zealand and Australia *viâ* Halifax, Bermuda, Jamaica, the Panama Canal and Tahiti (paras. 575–77).

(27) It is desirable that Australia, New Zealand, and the Union of South Africa should enjoy the special postal rates for periodicals and magazines, &c., sent from the United Kingdom, which are now enjoyed by Canada and Newfoundland (paras. 578–80).

Freight Rates.

(28) In the pre-War period Australia, New Zealand, and the Union of South Africa probably paid at least as much for ocean freights as in Customs duties. If the return freight charges to the United Kingdom are

added, the total charges for sea transport of merchandise to and from these parts of the Empire were a far heavier charge on commerce than were Customs duties. Since the War ocean freight rates have increased to a far larger extent than have tariffs, and the prevailing view is that freight rates will not return to the pre-War level for a long time to come (paras. 583–4).

(29) There is, therefore, ground for thinking that improvement in the cost of sea transport is amongst the most important problems confronting the statesmen of the Empire (para. 585).

(30) We are satisfied that the operations of the steamship companies should not remain longer without some measure of Government control. This view is based on two grounds:—

(*a*) That in normal times the combination of shipowners is strong enough to limit the freedom of shippers, whose varied and detached interests make it difficult for them to combine in any effective opposition.

(*b*) That in some cases shipowners have used this power to grant more favourable freight rates on foreign than on British goods (paras. 588–9).

(31) Our recommendations for securing control are as follows:—

(*a*) That contractors for the new mail services recommended above and all other subsidised services should be required to submit for approval to the Governments concerned a schedule of freight rates on the chief articles of import and export, supervision of which is important in the national interest.

(*b*) That Boards should be set up by Your Majesty's Government and the Dominion Governments for the purpose of making inquiry in cases where a *primâ facie* case is established that the interests of shippers are being adversely affected by the action of steamship owners or steamship conferences.

(*c*) That the functions of these Boards should be in the main directed to investigation and conciliation, but that they should be empowered, at their discretion, to order abolition of differential freight rates found to be inimical to Imperial trade (paras. 593–4).

Bills of Lading.

(32) For the reasons which we set out in detail we are strongly of opinion that legislation on the lines of the Harter Act of the United States (which imposes liability on the shipowner for the negligence of his servants in the stowage, delivery, &c., of merchandise) should be passed in the United Kingdom, the Union of South Africa and Newfoundland (paras. 595–603).

Handling and Distribution of Dominion Produce.

(33) The arrangements for the transport of produce from the Dominions by road between the docks and the central markets in London are unsatisfactory. Early attention should be devoted to improvements of the existing system by the Port of London and other authorities (paras. 605–6).

(34) The system already adopted by some of the Dominion Governments of appointing inspectors to supervise the unloading and selling of their produce in London and other large ports should be extended (para. 612).

(35) There should be a uniform standard in the United Kingdom for the inspection of meat (para. 612).

Telegraphic Communications.

(36) Further action towards the reduction of cable rates between the United Kingdom and the self-governing Dominions is an urgent necessity both for the encouragement of trade development and for the promotion of social intercourse (paras. 613–4).

(37) The present control over the private cable companies exercised by Your Majesty's Postmaster-General and other authorities is not effective for this purpose (paras. 615–7).

(38) Public opinion in all the Dominions is in favour of a policy which will secure State control of telegraph communication between the United Kingdom and Australia and New Zealand through Canada. In our judgment such control is essential if adequate reduction of rates is to be secured (paras. 618–9).

(39) We therefore recommend the State acquisition as soon as possible (either by lease or otherwise) of a cable across the Atlantic, with the necessary land line connection between Nova Scotia and Montreal, there to connect with the existing services administered by the Pacific Cable Board (para. 620).

(40) As soon as through communication has been obtained, action should be taken with a view to securing—

(*a*) cheapening of the full rate between the United Kingdom and Australia and New Zealand to 2*s*. per word, with corresponding reductions for non-urgent (*i.e.*, deferred and week-end) traffic. We look upon these reductions as the minimum required;

(*b*) lower rates for telegraphic business between Canada, Newfoundland and the United Kingdom than those now existing;

(*c*) considerable reduction in press rates (paras. 621–30).

The rates to and from the Union of South Africa should be correspondingly reduced (paras. 631–2).

(41) Throughout the revision of rates proposed above we have had constantly in view the desirability of enabling plain language messages to be sent to and from the most distant parts of the Empire at a charge not exceeding *6d.* per word (para. 614).

(42) We lay special stress on the necessity for the lowest possible press rates in view of the vital importance of the dissemination of Imperial news as fully, widely, and cheaply as possible (para. 629).

(iv) IMPROVEMENT IN COMMERCIAL PRACTICE.

General Trade Questions.

TRADE INTELLIGENCE.

(43) We make suggestions for the improvement of the commercial intelligence system in various parts of the Empire, particularly in the United Kingdom and Canada. Some of these suggestions are of general application; others are on points where, in our judgment, one part of the Empire could profit by the existing practice of another part (paras. 639–51).

(44) The institution of a Trade Commissioner service has proved of much benefit in promoting inter-Imperial trade. A considerable extension of this service is desirable both for the United Kingdom and the Dominions (paras. 652–61).

(45) For reasons which we set out, we are unable to recommend the creation of a single inter-Imperial trade intelligence system, but we advocate the fullest possible co-operation between the Trade Commissioners of the Mother Country and those of the self-governing Dominions (paras. 662–5).

(46) We comment on the work of the Consular service in relation to trade, with particular reference to the recent arrangements under which the services of British Consuls in foreign countries are utilised by the Dominion Governments. Suggestions are made for enhancing the value of these services (paras. 666–71).

STATISTICS.

(47) A quinquennial census of the population of the Empire on a limited scale is desirable in addition to the present decennial census.

A special census should be taken as soon as possible after the conclusion of the War (para. 672).

(48) It is urgent that steps should be taken to improve statistical methods and compilations now existing in the various parts of the Empire, particularly as regards movement of population, imports and exports, prices, wages and cost of living, and movement of capital (para. 672).

(49) The best method of bringing about such improvement is to call a conference of the statisticians of the Empire. We suggest agenda for such a conference, and outline the preliminary work needed if it is to have the best effect (paras. 673–5).

(50) In future the collection, collation, and publication of Imperial statistics should be entrusted to a central statistical office, working under the new Imperial Development Board recommended below (paras. 676–7).

EXHIBITIONS.

(51) The holding of periodic inter-Imperial Exhibitions is of value in the promotion of Imperial trade. We also attach considerable importance to Exhibitions, open to manufacturers and merchants only, of foreign goods competing with British goods in the various markets of the world (paras. 687–94).

Unification of Legislation.

(52) At present there are wide divergences between the legislation of the United Kingdom and the self-governing Dominions on—

(*a*) Patents.
(*b*) Trade marks.
(*c*) Companies.

Experience indicates that discussion of such subjects at Imperial Conferences is not likely to be productive of results, unless agreement is first reached by the expert advisers of the various Governments in conference or otherwise and the results submitted for ratification (paras. 695–98).

(53) We set out the main divergences in existing legislation in these three cases, and the nature of the action required to secure greater approximation to uniformity on various important points of difference (paras. 700–7).

(54) In connection with the complaints made to us on the subject of double income tax, we call attention to the concessions given as the result of legislation passed in consequence of the pressure of war taxation. We think that this legislation will form a valuable precedent in the future (paras. 708–10).

(55) We recommend co-operation between Your Majesty's Government and the Governments of the Oversea Dominions, with a view to the establishment throughout the Empire of uniform coinage based on the decimal system, and of uniform weights and measures, based on the metric system (paras. 711–13).

(v) CREATION OF AN IMPERIAL DEVELOPMENT BOARD.

(56) Existing organisations are inadequate to deal with the scientific development of the resources of the Empire, with the deepening of its harbours on a co-ordinated plan, with the improvement of its mail and cable services, the preparation and publication of its statistics, and other matters of joint interest to the Empire as a whole (paras. 715–19).

(57) To remedy these deficiencies we recommend the establishment of an Imperial Development Board. This Board, for really effective work, must represent not only the United Kingdom and the self-governing Dominions, but also India, the Crown Colonies, and

the Protectorates; in other words it must be concerned with the interests of the whole Empire (paras. 728–9).

(58) Detailed suggestions are made for the constitution and work of such a Board. In its initial stage it should be advisory (paras. 720–22 and 730–3).

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736. It is our hope and belief that these Conclusions and Recommendations will not be found to conflict with the systems to be evolved by the Allied Nations after the War.

737. The unanimity which is shown in all our Reports, and has been maintained throughout the deliberations of the first Royal Commission comprising representatives of all the self-governing communities of Your Majesty's Empire, is, we venture to think, of hopeful augury.

We make bold to assert, after five years' experience throughout the Empire, that the spirit of co-operation, so splendidly demonstrated in war, will be succeeded, after peace is declared, by absolute concord in the great task of reconstruction and development.

738. Your Commission desires to draw special attention to the services rendered by its staff. We have already expressed our opinion as to the exceptional capacity and the remarkable powers of work of our Secretary, Mr. E. J. Harding, of the Colonial Office. We consider that Mr. Harding's qualifications mark him out as destined to render notable services to the Empire. Mr. W. J. Glenny, of the Board of Trade, our Assistant Secretary, has displayed marked ability on all commercial and statistical subjects. Mr. A. E. Mitchell, of the Treasury, and Mr. A. H. Bridgman, of the Colonial Office, have been most assiduous in preparing the voluminous tables of statistics, and in correcting the highly technical evidence which has been summarised in the above Report, and is submitted separately to Your Majesty. No Commission has been served with greater zeal and devotion.

We regret to report the death of Mr. C. Brodie Bass, whose work was favourably mentioned in our Third Interim Report. Mr. Bass received a commission in the Yorkshire Regiment in December, 1914, and was killed in action in the autumn of 1915.

All of which we humbly submit for Your Majesty's gracious consideration.

D'ABERNON (*Chairman*).
H. RIDER HAGGARD.
TOM GARNETT.
W. LORIMER.
J. TATLOW.
A. E. BATEMAN.
GEORGE E. FOSTER (Canada).
J. R. SINCLAIR (New Zealand).
J. W. S. LANGERMAN (Union of South Africa).
EDGAR R. BOWRING (Newfoundland).

E. J. HARDING (*Secretary*).
W. J. GLENNY (*Assistant Secretary*).

London, 21st February, 1917.

APPENDIX I.

NOTES AS TO THE CONSUMPTION AND SUPPLIES OF CERTAIN COMMODITIES IN THE BRITISH EMPIRE.

NOTES.—Tons, except where otherwise stated, are tons of 2,240 lbs. avoirdupois.

Statistics of production, imports and exports, where no year is stated, are calculated on the average of the five years (1909 to 1913) immediately preceding the War.

(A.) MINERALS.

Aluminium.

No statistics of imports or consumption in the United Kingdom, &c., are available. The world's output has been increasing during recent years. Figures (unofficial estimates) of output in 1913 are:—

	Tons.
United Kingdom	10,000
Canada	6,000*
United States of America	30,000
France	15,000
Austria and Switzerland	15,000
Italy, Norway, Sweden, &c.	4,000
	80,000

Aluminium is produced from bauxite† (hydrated aluminium oxide), the chief sources of supply of which are France, United States of America, Italy, and Ireland. There are, however, proved deposits of importance in India and British Guiana. Bauxite and other aluminium minerals are known also to occur widely in Australia, especially in New South Wales and Western Australia.‡ The aluminium produced in the United Kingdom is obtained partly from bauxite produced in Ireland, and partly from imported bauxite. The Canadian Works at Shawinigan Falls, P.Q., use bauxite imported from the United States; a large proportion of the raw metal is shipped to the United States of America for manufacture. The works are owned by the Northern

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* A later estimate gives the Canadian output in 1915 at 10,000 tons.

† Cryolite is also used in the production of aluminium, *see* under "Cryolite."

Pp. 183 and 194 of Cd. 7172].

Aluminium Company, a subsidiary of the Aluminium Company of America. The Northern Aluminium Company has, however, been granted a lease of six bauxite deposits in British Guiana, on condition that within seven years it establishes within British territory refining works capable of producing about 4,000 tons of aluminium per annum. It is expected that these works will be set up in New Brunswick or Nova Scotia.

Although figures of consumption within the Empire are not available, there is little doubt that a considerable quantity of the aluminium used is drawn from outside sources, and it is to be observed that the Canadian works are under United States control.

Uses.—As a light metal of considerable strength, aluminium, in addition to its industrial uses, is largely employed for army equipment, and (mainly in the form of alloys) for motor-cars and flying machines. Aluminium powder is used for making paints employed extensively for ships' fittings, &c., on account of its protective action. Aluminium powder is also used for lights and flares, and in making explosives. Aluminium grain or coarse powder is employed in the production of thermit, which is of great industrial importance as a welding powder.

Antimony.

Antimony is not now mined in the United Kingdom. The home consumption is met partly by imports of crude antimony as well as antimony ore and regulus, and partly by re-smelting old type metal, &c. During the five years 1909 to 1913, the annual net imports of "crude antimony and regulus" averaged 6,100 tons, and those of ore 3,800 tons. In the same period the exports of "crude antimony and regulus" smelted or refined in the United Kingdom averaged 4,500 tons. Owing to the grouping in the returns of crude antimony with regulus, it is very difficult to obtain in terms of some one unit, such as pure metal, an estimate of the consumption of antimony in the United Kingdom; the term "crude antimony" as used in the trade refers to antimony sulphide obtained from the ore by the liquation process: this contains about 70 per cent. of pure antimony, whilst "regulus" is practically pure metal obtained by the reduction of the sulphide. The exports under the heading "crude and regulus" consist almost wholly of regulus, whilst the imports are mainly of crude antimony. A comparison of the recorded values in the import and export returns gives as a rough basis the metallic content of imported ores as 40 per cent., imported "crude and regulus" 75 per cent., and exported "crude and regulus" 95 per cent., whence it appears that the total imports represented an annual average of 6,100 tons of antimony, and the exports 4,200 tons. As a rough approximation, therefore, the annual home consumption may be put at 1,900 tons, excluding antimony obtained by re-smelting old metal. Since the outbreak of war the consumption has doubtless increased greatly, both in the United Kingdom and the United States of America. The consumption in the United States of America is much larger than in the United Kingdom, and was estimated before the War as being about 7,000 tons of pure metal a year.

China is at present the chief source of the world's supply of antimony ore and crude antimony. The treatment of the ores on a fairly large scale was commenced there in 1908, and since that year imports of ore into the United Kingdom have been much smaller than formerly. The world's production in terms of regulus in 1913 was estimated at about 25,000 tons, and the Chinese output probably represents considerably more than half this total. Prior to the War the Chinese sources of supply were largely in German hands, and they are still to some extent. Antimony is also produced in France, Algeria, Italy, Mexico, Austria-Hungary, Japan and Portugal. Australia is the chief supplier within the Empire, but the ore is known to occur also in New Zealand, Canada, South Africa, Newfoundland and India. Imports into the United Kingdom are derived mainly from China (crude metal and ore), Mexico (smelted ore), and Australia (ore). The Mexican supplies are in British hands, and the imports go to Newcastle to be refined. The output of ore in Australia (Victoria) was recently only about 2,500 tons; in earlier years (1906-1908) it was much larger (6,800 tons in 1907), but no doubt the development of the Chinese industry discouraged working in Australia. The Australian mineral was shipped to England in the form of concentrates, containing from 30 to 46 per cent. of pure antimony, and from 1½ to 2½ ozs. of gold per ton. Arrangements were begun in 1916 for local smelting in Australia. The high prices ruling for antimony since the outbreak of war have drawn attention to other Australian deposits, especially in Queensland, as well as to unworked deposits in other parts of the Empire. Thus in the Transvaal there was an output of 90 tons of ore in 1915, and of 290 tons in the first eight months of 1916. A revival also took place in antimony mining in Canada in 1915, and an output of about 430 tons of antimony refined and in concentrates was reported in that year. Prices of antimony have roughly quadrupled since 1914, but very high prices also ruled in 1906 and 1907.

The present output within the Empire is insufficient to meet requirements. It appears likely, however, that by encouraging production in Australia and Canada, and investigating the possibilities of deposits in New Zealand and South Africa, some of which have been worked to a small extent in the past, it might be possible to make the Empire independent of external sources of supply. The normal commercial demand for antimony is limited, but the demand always increases in war time.

The antimony market and industry in the United Kingdom are in the hands of a very few firms, and information on the subject is not readily available.

Uses.—Antimony is chiefly used as a hardening constituent of white metal alloys, and is employed largely for type metal (which contains from 8 to 12 per cent. of pure antimony), Britannia metal, anti-friction metals, shrapnel bullets, &c. It is also used in preparing important compounds used in the dyeing and rubber industries, and compounds of less importance used in pharmacy, glass-making and enamelling iron wares.

Asbestos.

Raw asbestos is not produced in the United Kingdom. The imports during the five years 1909 to 1913 averaged nearly 160,000 cwts. annually, of which about 140,000 cwts. were retained for use or manufacture in the United Kingdom. Of the total imports, Canada supplied about 84,000 cwts. and South Africa 13,000 cwts.; about 60,000 cwts. came from foreign countries, especially Russia and the United States of America, the asbestos from the latter country being probably of Canadian origin. Imports into the United Kingdom from Canada have shown a marked increase during recent years; in 1909 the Dominion supplied 42 per cent., and in 1913 65 per cent. of the total imports. The quantities of asbestos imported into the Dominions appear to be relatively very small, so far as they are recorded, but Canada imported manufactured asbestos to the average annual value of 70,000*l.* during the five years ended March 31, 1914—quantities are not stated in the official returns.

Deposits in the province of Quebec are the chief source of the world's supply of asbestos. The Canadian output averaged nearly 88,000 long tons a year in 1909-13, the production having steadily increased throughout the period.* In addition, asbestic, an inferior variety of asbestos, was produced in Canada to the average amount of 22,000 tons a year.† The bulk of the Canadian asbestos‡ is exported, notably to the United States, where a large and important industry is dependent on these supplies. Smaller quantities are shipped to the United Kingdom and other markets, either direct or through dealers in New York. Outside Canada, the production of asbestos within the Empire is small. Some quantities, averaging about 1,200 tons a year,* are quarried in the Union of South Africa, and there is also a small output in Rhodesia, where new deposits have lately been found. There are also deposits in Newfoundland, but these are not yet extensively worked. Trial shipments have been made from asbestos fields in Tasmania, and the establishment of a treatment mill at Macquarie Harbour has been proposed. Deposits have also been found in South Australia and New Zealand, but the production has been trifling. Cyprus shows a small but increasing production, and reports indicate the occurrence of asbestos in India. Amongst foreign countries Russia is the most important producer; the Russian output averaged 14,000 tons a year in 1909-13. Italy produces small quantities of very fine silky asbestos. A few thousand tons are also raised annually in the United States of America. It is estimated that in 1909-13 Canada furnished about 80 per cent. and Russia about 12 per cent. of the world's supplies of raw asbestos. It is quite clear that the Canadian production is more than sufficient to meet the demand for raw asbestos within the British Empire, but it is to be noted that the United Kingdom, although possessing the most up-to-date plants and methods, is largely dependent on foreign sources for the manufactured asbestos it uses. In 1913 the net imports of asbestos manufactures were valued at 232,000*l.*, whilst the exports of articles of asbestos manufactured in the United Kingdom (excluding engine packing) were valued at 105,000*l.* Quantities and countries of origin are not recorded.

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* In 1914 the output was 96,000 tons, and in 1915 101,000 tons.

† In 1914 19,000 tons, and in 1915 23,000 tons.

‡ An account of the Canadian asbestos industry will be found on pp. 46-7 of [Cd. 8457].

Uses.—The use of asbestos for industrial purposes has developed greatly during the last decade, especially in the United States of America. True asbestos (chrysotile asbestos) is fibrous, and is woven into acidproof and fireproof tissues, &c., whilst the short-fibred, harsh, brittle variety, commonly called asbestos, is only used for fire-resisting and heat or cold insulating materials, roofing tiles, and other building material. The industrial applications of asbestos are practically unlimited.

Barytes and Witherite.

The average quantity of barytes (barium sulphate) and witherite (barium carbonate) mined in the United Kingdom in the five years 1909-13 was 45,000 tons. The net imports averaged

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* In 1915 this increased to 3,000 tons.

49,000 tons and the quantity exported 9,000 tons. The trade returns of the Dominions do not record any imports. Deposits are worked in Nova Scotia to a relatively small extent, and are known to occur in other parts of Canada. South Australia is regularly producing a small tonnage of high-grade barytes for local consumption and for export to other Australian States. Deposits exist in several localities in Tasmania, but the high cost of transport has prevented development. Small deposits occur on the west coast of the South Island of New Zealand.

Before the War Germany and Belgium were the chief sources whence the barytes imported into the United Kingdom was obtained. As barytes is of relatively low value (the average price of the imports in the years 1909-13 was about 3*l.* per ton), it is unable to bear a high rate of freight. Most of the supplies formerly imported from Germany were obtained from mines near the Rhine whence the produce could be shipped direct to London. It does not therefore seem practicable to supply from the Dominions the deficiency in the United Kingdom, which is estimated to use annually about 100,000 tons of barytes and baryta products, chiefly in the paint trades. Any increased output in the Dominions overseas should go hand in hand with a development of the local paint or other industries using it.

Uses.—Barytes is used in the preparation of various paints, especially lithopone, a white paint which has replaced white lead for many purposes. Prior to the war Belgium was one of the chief suppliers of lithopone. Other uses of barytes and its preparations are found in the paper-making, textile, oilcloth, and rubber industries, whilst small quantities are employed in the pottery trade and for enamelling iron and steel. Various barium compounds for industrial purposes are also obtained from barytes. Witherite is used in sugar refining and for making salts of barium.

Borax.

At the present time the Empire is entirely dependent on foreign sources for its supplies of borax and boron compounds generally. Imports of the chief ores into the United Kingdom during the five years 1909-13 averaged as follows:—

Borate of lime ...	14,000 tons (almost entirely from Chile and Peru).
Boracite	4,000 tons (mainly from Asiatic Turkey).

Borax itself was imported to the average extent of about 1,200 tons annually; the imports came almost wholly from France. The average imports of borax and boron ores taken together represent roughly 10,000–12,000 tons of borax. No figures can be traced as to home consumption or exports, but considerable quantities are shipped, especially to the Dominions. Canada imports about 1,200 tons of borax annually, almost entirely from the United Kingdom. Borax is not specified in the Australian trade returns, but an average annual import of about 300 tons of boric acid is recorded—almost entirely from the United Kingdom. Imports of borax into South Africa average about 400 tons a year, practically all from the United Kingdom.

The chief sources of supply of borax ores are Chile, Peru, the United States of America (where some of the higher grade deposits are said to be giving out), and Asia Minor; borax is also found in Germany, Austria, and Italy. So far as is known, none is obtained from any sources within the Empire. The trade in Europe is controlled by Borax Consolidated, who hold important deposits in the Argentine and Peru, which they are now developing.

Uses.—Borax and boracic acid are of great value as food preservatives and antiseptics. Borax is also used in metallurgy, enamelling, pottery and the manufacture of artificial gems.

Chromium.

Chromium and chromium compounds are obtained mainly from chromite (chrome iron ore). New Caledonia and Rhodesia are the principal sources of this ore and together supply about 90 per cent. of the world's consumption, which is of the order of 150,000 tons of ore a year. Chromite is also obtained in Greece, Asiatic Turkey, Russia and Newfoundland; deposits are known to exist in the Transvaal and Australia. Chromite deposits were worked in the past at Nelson, New Zealand, and about 6,000 tons were raised; at present there is no production. Small quantities used to be mined in Canada, and as a result of the revival in demand there was considerable activity in 1915 in the chromite-producing area in Quebec; about 10,000 or 12,000 tons were shipped from the district in consequence of the reopening of old pits and the examination of old dumps. Chromite is also found in Baluchistan; the output in 1913 was about 3,400 tons and 3,000 tons in 1914, with a smaller yield in 1915.

No statistics of imports or consumption of chrome ores, ferrochrome and chromium steel in the United Kingdom or other parts of the Empire can be traced, but there is no doubt that the Empire is largely dependent on foreign supplies. The Rhodesian ore is shipped mainly to the United States of America and France. The average annual exports from Rhodesia in the five years 1909–13 was 52,000 tons, of which the United States took 24,000 tons, France 15,000 tons, the Netherlands 5,000 tons and the

United Kingdom 2,500 tons. The output from Rhodesia (*i.e.*, exports) in 1913 reached 57,000 tons, in 1914 46,000 tons, and in 1915 54,030 tons. In 1913 (the average figures for the five years 1909–13 are not available) New Caledonia shipped 26,000 tons to the United States of America, 18,000 tons to the United Kingdom 16,000 tons to the Netherlands, and a smaller quantity to France.

Before the War the ferro-chrome industry was mainly French, but there is a considerable consumption in the United States of America, Germany, and the United Kingdom. It seems probable, though definite figures are not available, that the requirements of the United Kingdom could all be met from the chromite deposits of Rhodesia and the Transvaal, and elsewhere within the Empire.

Uses.—Chromite is the source of the oxides of chromium, of chromates, bichromates, and other compounds, but its main use is for making ferro-chrome and metallic chromium, both of which are employed in making chrome steel, commonly in association with one or more special metals, including nickel, manganese, tungsten, molybdenum, vanadium, &c. Chrome steel is of great importance in munition work. Chromite is also used in the raw state, and in bricks for lining steel and other furnaces.

Cobalt.

Imports of cobalt ores into the United Kingdom are no longer recorded, and it has not been possible to trace any figures indicative of the consumption of cobalt in the Empire. There is no doubt, however, that the Empire is independent of outside supplies, as the silver-cobalt-nickel ores of the Cobalt District, Ontario, are the chief source of the world's supply of cobalt. Only a small part of the cobalt contained in these ores has been recovered, and they have been sold without reference to their cobalt content; the cobalt, which is produced mainly in the form of oxide, is a by-product of the smelting works for which the mine owners receive little return. Large quantities of cobalt are believed to exist in the waste of the smelting works, and it has been estimated that 7,000 tons of cobalt, valued at 2,000,000*l.*, have been wasted since 1904 in the residues of the Ontario ores Under a Provincial Act passed in 1907 the Ontario Government pay a bounty of 6 cents per lb. on the metallic content of cobalt oxide made in the Province; in 1912 the amount so paid was 2,100*l.*, and in 1913 5,400*l.* In the former year 102 tons of refined cobalt oxide was produced in Ontario, and in 1913 296 tons; the output in 1914 was considerably smaller. Deposits of cobalt minerals are found in the Transvaal, but are not being worked.

Uses.—Cobalt is mainly used in the form of the oxide as a pigment for ceramic industries. Formerly most of the supply was derived from cobalt ores raised in New Caledonia, but the opening of the cobalt-silver mines about 1904 led to a large over-production of cobalt ore and cobalt oxide, the result of which was to reduce the price of the oxide very greatly and to put the trade almost entirely in the hands of the Canadian refiners. The demand for the porcelain industries of England and Germany fell off owing to the war, and attention has been directed to the metallurgical uses of cobalt. The Canadian Government has caused extensive investigations to be made on this subject, and metallic cobalt* is now being produced in Canada for high-speed steel, and for use in metal plating instead of nickel, which metallic cobalt greatly resembles in many of its qualities. It is possible that in the future cobalt may become of great importance in the production of munitions of war.

Copper.

The world's production of copper is at present about 1,000,000 tons per annum, of which the U.S.A. supplies more than half. The average production for 1909–13 was 917,000 tons, and for 1913 990,000 tons. The following figures show the estimated amount of fine copper obtained in 1913 from ores mined in the countries mentioned :—†

	Tons.
United States ...	548,100
Japan ...	71,800
Spain and Portugal ...	53,800
Mexico ...	51,900
Australia	46,500
Chile ...	39,500
Canada ...	34,300
Russia ...	34,000
Peru ...	25,300
Germany	24,900
Norway ...	8,600
German S.W. Africa	7,000
Belgian Congo	6,700
Serbia ...	6,300
South Africa ...	5,700
Austria-Hungary	4,200
Bolivia ...	3,600
Cuba ...	3,500

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* In 1915 212,000 lbs. of metallic cobalt and 379,000 lbs. of cobalt oxide were produced in Canada, equivalent to a total of 477,000 lbs. of metal.

† The figures represent tons of fine copper, produced from ore mined in the country named. Copper smelted from imported ore, regulus, precipitate, &c., is excluded.

Figures of smelter production of copper in various countries, including the output from imported ore, &c., naturally differ from those above. Estimates for 1913 in terms of unwrought copper* are as follows:—

	Tons.
United States	579,700
Canada	13,600
Other American countries (Mexico, Chile, Peru, Bolivia, &c.)	88,500
United Kingdom	51,300
France	11,800
Germany	40,400
Russia	33,700
Spain	23,200
Asia (chiefly Japan)	76,000
Australia	41,100

There is not much copper ore mined in the United Kingdom, the average output for 1909–13 being about 3,000 tons, with an estimated copper content of 295 tons. There was also 105 tons of copper produced from native precipitate, giving a total actual production of United Kingdom copper of some 400 tons. The total output of unwrought copper in the United Kingdom (quantity smelted or refined in the United Kingdom), however, during the same period was 48,300 tons, made up as follows:—

	Tons.
From native ores and precipitate	400
,, imported ores	8,400
,, ,, regulus and precipitate ...	24,300
,, ,, cuprous pyrites	15,200
Total	48,300

Deducting the copper contained in manufactures exported, the actual pre-War consumption of copper in its various forms in the United Kingdom may be estimated at about 120,000 tons of metallic copper per annum, so that of the requirements of the United Kingdom only about 40 per cent. could be supplied by copper smelted in this country, and the remaining 60 per cent. would need to be imported. The imports of unwrought copper from the British Empire averaged 21,000 tons, leaving some 51,000 tons, or nearly 43 per cent. of the total supply, to be imported from foreign countries. This figure does not, however, represent the total dependence of the United Kingdom on foreign sources of supply, because by far the greater proportion of the imported ore, regulus, &c., comes from countries outside the Empire. It is not possible to say just what the proportion was, but probably at least 75 per cent. of the 48,300 tons of copper was smelted from foreign ores, regulus, &c. It would therefore appear that of the 120,000 tons required by the United Kingdom only 33,000 tons, or 27 per cent., were supplied from Empire sources, the remaining 73 per cent. being from foreign sources.

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* Statistics in terms of fine copper are not available.

The actual production of copper within the Empire in 1913 was as follows :—

	Tons.
United Kingdom	400
Australia	46,500
South Africa	5,700
Canada	34,300
Total	86,900

i.e., about 72 per cent. of the United Kingdom's requirements.

Adding to the figure given above the 7,000 tons produced in German South-West Africa, this gives a total of about 94,000 tons. This represents less than 80 per cent. of the requirements of the United Kingdom alone, without taking into consideration the requirements of the other parts of the Empire.

It is not easy to estimate the total consumption of the Empire of copper in its various forms, but taking 12,000 tons as the share of the United Kingdom, it is probable that the Empire consumption is at least 150,000 tons. The quantities available from Empire sources are only sufficient to supply about 60 per cent. of these requirements.

Information as to the copper resources of the Self-governing Dominions has been given on pp. 81, 93, 105, and 109 of this Report.

Cryolite.

The only deposit of cryolite which is being worked is situated at Ivigtut, Greenland, and is owned by a Danish company. The output in 1913 was about 10,200 tons, of which about 1,900 tons were shipped direct to the United States of America, the remainder being sent to the works in Copenhagen; in 1914 the output was 11,300 tons, of which the United States took 4,000 tons. Some portion of the United States imports is re-shipped to Canada for use in the aluminium industry. Imports into Canada during the five years ended 31st March, 1914, averaged 490 tons per annum, practically from the United States.

No figures of imports into the United Kingdom are available, but the Danish trade returns show that in 1912 about 840 tons and in 1913 about 1,020 tons of "purified" cryolite was exported to the United Kingdom. This presumably represents the quantity of the mineral shipped after treatment in the Copenhagen works. Denmark also exports to Germany, France, Russia, Scandinavia, Switzerland, and Austria-Hungary.

No records have been traced as to commercial occurrences of cryolite in the Empire.

Uses.—The most important use of cryolite is for making the fusion bath in which bauxite is dissolved for the manufacture of aluminium by the electrolytic process; it is also used in the production of opal glass and enamels, and of certain soda compounds.

Graphite.

Natural graphite, or plumbago, is no longer produced in the United Kingdom, though it was formerly worked in Cumberland and the South of Scotland. The net imports into the United Kingdom during the five years 1909 to 1913 averaged about 16,000 tons a year. The following figures show the relative importance of the various sources of supply to the United Kingdom:—

	Average Imports, 1909–1913. Tons.
From India	1,450
,, Ceylon	5,910
,, Canada	70
,, Other British possessions	40
	7,470
	Tons.
From Germany	2,660
,, Madagascar	1,180
,, Italy	1,030
,, Japan	3,210
,, Other Foreign Countries	1,710
Total from Foreign Countries	9,790
Total Imports	17,260
Less Re-Exports	1,050
	16,210

The South African trade returns record small imports of plumbago. Australia imports about 10,000*l.* worth a year, largely from the United Kingdom and United States of America. Canada imports plumbago and plumbago crucibles.

The estimated annual output of natural graphite in the principal producing countries during the period 1909–1913 averaged as follows:—

	Tons.
Austria	41,000
Canada	1,500
Ceylon (exports)	30,000
Italy	12,000
Japan (Korea) about	10,000
Mexico	2,000
U.S.A.	4,000
Madagascar	8,000 (1913)

There is a considerable output in Bavaria, but recent figures are not available, and Mexico is also a producing country. Production was commenced in Madagascar on a commercial scale in 1910; by 1913 the output had risen to 8,000 tons. The Ceylon graphite (plumbago) is of a very valuable grade, and fetches much higher prices than that produced elsewhere. The graphite now being obtained from Madagascar is, however, almost, if not quite, equal to the Ceylon product. In 1913 the average price of graphite imported into the United Kingdom from Ceylon was 27*l.* a ton, from Madagascar 23*l.*, and from all other sources 8*l.* Ceylon exports only about one-fifth of her output to the United Kingdom; thus in the five years 1909–1913, out of a total export averaging 30,000 tons a year, only 5,500 tons were shipped to the United Kingdom, 14,600 tons went to the United States of America, 7,000 tons to Germany, and 2,700 tons to Belgium. The Ceylon output is probably much more than sufficient to render the Empire independent of foreign sources of supply.

Graphite is found in Australia and New Zealand, but it is not worked to any extent. There is a small output in the Transvaal. In Canada, graphite is mined in Eastern Ontario and in Quebec: the output has been increasing in recent years; the major portion of it is exported. The output of milled and refined graphite in Canada in 1915 was about 2,300 tons.

Artificial graphite is produced from bituminous coal in electric furnaces at Niagara Falls, United States of America, by the International Acheson Graphite Co., and largely used as electrodes.

Uses.—The chief uses of graphite are in the production of crucibles, lubricants, pencils, stove polishes, pigments, electrodes for electric furnaces, &c. The world's consumption of natural graphite has been recently estimated at about 100,000 tons a year, of which about 54,000 tons were used for crucibles and 30,000 tons for lubricants; the demand for the latter purpose has been increasing greatly in recent years. Graphite is valued according to its freedom from grit, its carbon content, and, above all, its grain. For crucibles the coarse-grained Ceylon graphite is the best; hence its much higher price. Although artificial graphite is largely used for lubricating purposes and for electrodes, it is little used for crucible making, as it is amorphous, *i.e.*, totally devoid of grain.

Iron.

The world's production of pig-iron in the years 1909–13 averaged 66,800,000 tons; in 1913 it was about 76,500,000 tons.

The chief countries contributing to the total (1909–13) were the following :—

	Tons.
United States	27,495,000
Germany	15,780,000
United Kingdom	9,616,000
France	4,350,000
Russia	3,590,000
Austria-Hungary	2,037,000
Canada	823,000
Sweden	629,000
Spain	438,000
Italy	325,000

The average annual production of the United Kingdom is thus 9,616,000 tons. Of this, only 4,870,000 tons were produced from native ores, the remaining 4,746,000 tons being obtained from imported ores.

Practically all the iron ore imported into the United Kingdom came from foreign countries, only very small quantities being imported from Empire sources—chiefly Canada and Newfoundland. The pig-iron produced from imported ores from Empire sources probably did not exceed 50,000 tons per annum on an average.

The total production of pig-iron from native ores in the Empire was therefore roughly as follows :—

	Tons.
United Kingdom (from U.K. ores)	4,870,000
,, ,, (from other Empire ores)... ...	50,000
Canada	823,000
Australia	35,000
Total	5,778,000

This represents only about 8½ per cent. of the world's total production of pig-iron.

The consumption of pig-iron in the United Kingdom averages 8,606,000 tons per annum. The actual furnace production (9,616,000 tons) is 12 per cent. in excess of this figure, but the supplies from Empire sources (4,920,000 tons) only represent 57 per cent. of the United Kingdom's requirements.

The following is an estimate of the average consumption of pig-iron in the Empire during the years 1909–13 :—

	Tons.
United Kingdom	8,606,000
Australia	86,000
Canada	1,036,000
Other	250,000
Total	9,978,000

As the supply of pig-iron from Empire ores mined within the Empire was only 5,778,000 tons, it would appear that the Empire is only able to satisfy her requirements of pig-iron from her own resources to the extent of about 58 per cent. The deposits of iron ore within the Empire are, however, huge and more than enough to supply the demand for many years to come. An account of the iron ore deposits in the self-governing Dominions will be found on pp. 84, 95, 98, 104, and 110 of this Report. Figures as to the demand for, and the supplies of different varieties of iron in the Empire and other parts of the world, are given in Mr. Wallace Thorneycroft's evidence, on pp. 230–240 of [Cd. 6517].

Lead.

The world's production of lead amounted during the years 1909–13 to an average of 1,125,000 tons per annum. In 1913 it amounted to 1,170,000 tons, and the following table shows the chief sources of supply :—

	Tons.
United States	401,200
Spain	199,700
Germany	178,000
Australia	114,000
Mexico	61,000
Belgium	49,800
United Kingdom	33,400
Austria-Hungary	23,700
Italy	21,400

With regard to the United Kingdom figure above, it may be noted that only 19,800 tons of lead were obtained from native ores. Of the remaining 13,600 tons, the quantity smelted from ores imported from other parts of the Empire was probably about 5,000 tons, thus giving a production of lead in the United Kingdom from Empire ores equal to 24,800 tons

The total Empire production of metallic lead from Empire ore was approximately as follows :—

	Tons.
United Kingdom	24,800
Australia	114,100
Canada	16,800
Total	155,700

Thus the total Empire output only represented about 13 per cent. of the world's production of pig-lead.

Turning to the question of consumption, the United Kingdom consumption of unwrought lead during the five years 1909–13 was as follows :—

	Tons.	Tons
Lead smelted in the United Kingdom ...	33,400	
Imports of pig and sheet lead	210,000	
Total supplies	—	243,400
Less exports :—		
Contained in ore	5,000	
Pig and sheet lead	42,000	
Contained in manufactures	17,400	
Total exports	—	64,400
Consumption in the United Kingdom		179,000

Thus, if the Empire production was only 155,700 tons, it would only supply about 86 per cent .of the requirements of the United Kingdom. Taking into consideration the consumption of pig-lead in other parts of the Empire, we get a total consumption of about 212,000 tons, made up as follows :—

	Tons.
United Kingdom	179,000
Canada	22,500
Australia	9,500
Other Empire	1,000

Therefore, the production of lead within the Empire in 1909–13 only supplied the Empire requirements in this metal to the extent of some 73 per cent.

It is probable, however, that the deficiency in Empire supplies of lead will be largely met from resources which are being developed in Burma. At Bawdwin, in the Northern Shan States, silver lead ores were mined by the Chinese in early times, and large accumulations of slag from these workings have been treated by the Burma Corporation, Ltd., at a smelter at Mandalay and later at Mantu, near the mines belonging to the Corporation: in all about 182,000 tons of slags containing 75,814 tons of lead and 705,000 ozs. of silver have been smelted and realised. Mining operations are being carried on by the Corporation and the deposits have been found to be very valuable. The ore reserves at July, 1916, were estimated to contain about 903,000 tons of lead, about 688,000 tons of zinc, about 19,000 tons of copper, and about 83,000,000 ozs. of silver. The refined lead produced during 1916 was 11,080 tons.

Information as to lead production and deposits in the self-governing Dominions will be found on pp. 82, 94, and 110 of this Report.

Magnesite.

No statistics are available as to the imports or consumption of magnesite in the United Kingdom. There is no home production.

Austria, Greece, India, and the United States of America were, before the war, the chief sources of supply of magnesite. The following was the estimated annual output in each case, based on the average figures for 1909–1913, viz.:—

Austria-Hungary (exports),	172,000 tons	(calcined).
Greece	57,000 ,,	(crude).
plus	25,000 ,,	(calcined).
India	8,000 ,,	(crude).
United States of America	11,000 ,,	(calcined).

There was also an output of a few hundred tons a year in Quebec. This has been greatly increased since the outbreak of war; the production of magnesite in Canada in 1915, chiefly crude but including some calcined, was about 14,000 tons, as compared with an average production from 1909–1914, inclusive, of 560 tons. Magnesite is found in other parts of Canada, *e.g.*, British Columbia and the Yukon, but, so far as is known, these deposits are not worked. Magnesite is being worked in South Australia for use at Port Pirie, where almost the whole production of the State is consumed. It occurs also in Queensland, but not in commercial quantities. There is a small production in the Transvaal. It is apparently very doubtful whether the output within the Empire is at all adequate to meet the demand.

Uses.—Magnesite is of considerable industrial importance as a material for refractory bricks and furnace linings, and as a source of magnesium salts. It is also used in the manufacture of certain cement floorings.

Manganese.

The estimated annual consumption of manganese ores in the United Kingdom in the five years 1909–1913 was 430,000 tons; the demand is greatly increasing. A very small proportion of the ores was obtained from mines at home: manganese ore is raised in Wales, and deposits which are no longer worked occur in Cornwall and Devon. The average output of ore in the United Kingdom in 1909–1913 was only 4,500 tons, nearly all from mines in Carnarvonshire. In the five years referred to, the annual imports into the United Kingdom from British India averaged 190,000 tons, from Russia 170,000 tons, and from Brazil 54,000 tons. In this period only 32 per cent. of the total exports of these ores from India (averaging 607,000 tons annually) were sent to the United Kingdom, the remainder going chiefly to Belgium, the United States of America, and France. The imported ores are richer in metallic content than the Welsh ore: the latter contains only about 32 per cent. of manganese, whilst the ores from India contain 45 to 55 per cent. (those from the Central Province having the largest metallic yield), from Russia 45 to 56 per cent. and upwards, and from Brazil about 53 per cent. In addition to manganese ores proper there are considerable imports into the United Kingdom from Spain and elsewhere of ferruginous manganese ores (say, 20 to 40 per cent. of manganese and rich in iron), and manganiferous iron ores (say 8 per cent. and upwards of manganese). At the present time (1916–17) a large proportion of the Brazilian ore is going to the United States, where it is used in the production of ferro-manganese. India could supply the whole of the manganese required at present for use in the Empire.

In the Dominions there are extensive deposits of manganese in Queensland, but the quantity raised is small, being only of the order of a thousand tons annually. The Mount Morgan Gold Mining Company uses most of the Queensland ore, but a few hundred tons of Russian manganese ore are imported into the Commonwealth annually from the United Kingdom. Manganese ore is also found in New South Wales, Victoria, South Australia, and Western Australia, but the output is small, the low price of the ore having prevented development. Some quantities of high-grade ore were shipped from South Australia to the United Kingdom in 1916. Deposits exist in many parts of New Zealand, and some of them were worked to a small extent in past years. Manganese occurs in various parts of Canada, but it is not worked to any extent: a few hundred tons have been raised in different parts of Nova Scotia. Extensive deposits of low-grade manganese ore exist near Conception Bay in Newfoundland, but so far only sample shipments have been sent to the United States for testing. In South Africa small quantities have been obtained in the Cape Province. Egypt has large deposits of iron manganese ores of great future value, as, although they are low in manganese (30 to 40 per cent.), their other constituent is mainly iron, and they are almost free from silica. Deposits also exist in West Africa.

Uses.—Manganese finds its principal use in the iron and steel industry. Manganese ores are added to iron ores for smelting, and smelted by themselves for making spiegeleisen and ferro-manganese, both of which are used largely in steel making. Manganese ores and compounds are also employed in the manufacture of chlorine and bleaching powder, in making electric dry cells, in smelting lead and other ores, and for colouring and decolourising glass, &c.

Mica.

Imports of mica into the United Kingdom averaged 34,200 cwts. a year in the period 1909–1913: of this quantity British India furnished 29,500 cwts. and Canada 1,100 cwts. The greater part of the mica reaching the United Kingdom is re-exported; in 1909–1913 the re-exports (largely to Germany and the United States of America) amounted to an annual average of 21,700 cwts. The Home Office returns of mineral output record a large production of "mica" in the United Kingdom; the figures for 1909–1913 average 27,000 tons. This, however, is almost wholly mica clay, obtained as a by-product from china-clay works, and is of no value for the more important industrial purposes for which sheet mica is used. The recorded value (at the workings) of the mica produced in the United Kingdom averaged only 7*s.* per *ton*, as compared with about 4*l.* per *cwt.* for imported mica (1909–1913).

India, the United States, and Canada are, in the order named, the chief sources of the world's supply of mica. The Canadian deposits are of special importance as being practically the sole commercial source of phlogopite or amber mica. This is softer and more flexible than the muscovite, or white mica, which is raised in India and the United States of America. Canada exports about 7,000 cwts. of mica a year, about 85 per cent. going to the United States of America, and the bulk of the remainder to the United Kingdom. The exports from British India averaged 49,000 cwts. (1909–1913); the United Kingdom took about 52 per cent., the United States of America 20 per cent., and Germany 16 per cent.

Mica is known to occur in Australia and Newfoundland, but is not worked commercially. Small quantities are raised in the Transvaal. It is a very widely distributed mineral, but very few deposits do or are likely to yield it in plates of the size required for the principal uses. There seems no doubt that India and Canada are able to meet the whole of the demand for mica within the Empire.

Uses.—Mica is used largely as an insulating material in electrical appliances; other important uses are for glazing windows of stoves and furnaces and for making lamp chimneys, and the diaphragms of phonographs. Ground mica is employed in the manufacture of certain paints, lubricants, piston packing, &c.

Molybdenum.

Molybdenum and molybdenum ore are not separately recorded in the trade returns of the United Kingdom, and no statistics of imports or consumption are available. The only commercial ores are molybdenite (the sulphide) and wulfenite (molybdate of lead). The former produces at least 96 per cent. of the molybdenum metal or its alloys or compounds consumed. Molybdenite occurs in low-grade deposits in Ireland, but it is doubtful if in sufficient quantities to become a commercial source of supply. At the present time Australia (Queensland and New South Wales) and Norway are the chief sources of molybdenite, but production commenced in Canada in 1914, and the United States is a considerable producer both of molybdenite and wulfenite.

The export of molybdenite from Australia averaged 105 tons a year in 1909–1913: of this figure 35 tons went to Germany, 40 tons to France, and 27 tons to the United Kingdom. The most important deposits worked in Australia are in the Chillagoe district, Queensland, and in certain districts in New South Wales. Molybdenite also occurs in Tasmania, New Zealand, South Africa, Newfoundland, Labrador, and many other countries. Many deposits exist in Canada; working is now taking place in Ontario.* It is probable that in the future Canada may become an important source of supply.

Uses.—The most important industrial use of molybdenum ore is in the production of ferro-molybdenum, which is used in the production of special steels. Molybdenum oxides and its salts are also of industrial importance, but the amount of ore used in their manufacture is extremely small in comparison with that for steel-making.

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* The Canadian Department of Mines reported an output of about 28,000 lbs. of molybdenite in 1915.

Nickel.

The imports of nickel and nickel ore are not separately recorded in the trade returns of the United Kingdom and no figures as to consumption can be traced.

Canada and New Caledonia furnish the bulk of the world's supply of nickel ore. The ore raised in Canada represented (in 1913) about 22,000 tons of nickel,* whilst it is estimated that the metallic content of the ore shipped from New Caledonia in the same year was about one-third of that figure. Small quantities of nickel ore are also raised in Norway, Saxony, Greece, and the United States of America.

In Canada, the silver-cobalt ores of the Cobalt district yield some quantities of nickel, but this source of supply is insignificant in comparison with the nickel-copper ore deposits of the Sudbury District (Ontario). The Sudbury output has so far been practically in the hands of two companies, viz., the Mond Nickel Company and the Canadian Copper Company, the latter being a subsidiary of the International Nickel Company of New York. These companies roast and smelt the ore locally into matte, usually containing about 80 per cent. of nickel and copper (the actual contents vary, but roughly average two of nickel to one of copper). The nickel has not hitherto been extracted from the matte in Canada; the Mond Nickel Company ship it to its works in South Wales for refining and separation. The Canadian Copper Company, which deals with larger quantities of ore than the Mond Company, sends its matte to the works of the International Nickel Company, New Jersey, for refining. The output of metal of both companies is understood to have increased since the war. An alloy of copper and nickel, called "Monel" metal, which is used for industrial purposes, is produced from the matte by the International Nickel Company, without refining and separating the copper and nickel. The Canadian trade returns show that the exports of "fine nickel, contained in ore, matte, and spiess" averaged 17,600 tons a year in the five years ended March 31st, 1914†; of this total 15,200 tons went to the United States of America and 2,300 tons to the United Kingdom.

Returns are not available showing the amount of nickel contained in the ores and matte shipped from New Caledonia, but the 1913 exports (92,000 tons of ore and nearly 6,000 tons of matte) probably represented from 7,000 to 9,000 tons of metal. The new

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* The corresponding figures for 1914 and 1915 are 20,000 tons and 31,000 tons respectively.

† This figure has been greatly increased since the war: exports in the 12 months ended March 31st, 1916, were about 31,000 tons, of which 26,000 tons were sent to the United States of America, and 5,000 tons to the United Kingdom.

Caledonian ores were shipped mainly to Europe (France, the United Kingdom, Belgium, and Germany), but they and matte from them are also smelted in the United States of America by the United States Nickel Company.

The world's annual output of metallic nickel is estimated to have averaged nearly 24,000 tons in the period 1909-1913, and was steadily increasing. Over half the total was produced in North America (United States of America); the output in the United Kingdom and Germany averaged about 5,000 tons each, that of France being rather smaller.

Nickel ore is not mined on a considerable scale in any of the Dominions except Canada. Copper-nickel ore has been raised on the west coast of Tasmania, where there are promising deposits, but operations ceased on the outbreak of war; in 1914 the quantity raised was 3,089 tons, valued at 15,815*l*. at the mine. It is known to exist in Newfoundland, South Africa, Egypt, and Greece, and occurrences are reported from Australia. The Madagascar ores resemble those of New Caledonia, and will probably prove of importance.

There is no doubt that Canada is able to furnish all the nickel ore required for use in the Empire, but the Canadian deposits are largely controlled by United States capital, and the larger part of the ore raised has hitherto been smelted in the States, though arrangements are now being made for the erection of smelters in Ontario by the International Nickel Company and the British America Nickel Corporation. The absence of refining facilities in Canada caused considerable agitation in the Dominion both before and after the outbreak of war, and it was suggested that the export of ore or matte should be prohibited in order to prevent supplies from Canada from reaching enemy countries. This was not done, but arrangements were made to ensure the safe disposal of Canadian nickel. An account of the Canadian nickel industry will be found on pp. 45–6 of [Cd. 8457].

Uses.—Nickel is used in a large number of non-ferrous alloys and as a protecting and hardening cover for articles made of other metals, on which it is deposited electrolytically. Added to steel in the proportion of 2½ to 3 per cent., with or without the addition of other metals, it forms an important alloy, nickel steel being largely used for armour plating and in munitions of war, although more largely for automobile parts and structural work where lightness is necessary. Other steel alloys of industrial or military importance are obtained by using nickel in combination with chromium, tungsten, molybdenum, &c. Nickel and copper-nickel alloys are also coined for currency of small denominations. There is some prospect that metallic cobalt, which has similar properties to nickel, may displace the latter for certain purposes.

Nitrate of Soda.

The average annual imports of nitrate of soda into the United Kingdom in the five years 1909–1913 were 122,000 tons, of which 117,000 tons came from Chile. Re-exports averaged 9,000 tons, leaving 113,000 tons for consumption in the United Kingdom. Imports into Canada in the same period averaged 27,000 tons, of which about half were entered as coming from Chile, and about half from the United States, the latter imports being probably of Chilean origin. Imports into Australia were rather more than 3,000 tons a year; practically the whole of this total came from Chile. The trade returns of New Zealand do not show the quantity of nitrate imported, and such figures as are available from South Africa show that the Union purchases very small quantities only.

No record can be traced of the existence of any commercial deposits of nitrate of soda within the Empire. The chief, and practically the only, source of the world's supply of native nitrate is northern Chile, where vast deposits exist. The exports from Chile averaged about 2,400,000 tons a year in 1909–1913; about 20 to 25 per cent. of this went to the United States of America, most of the remainder being shipped to Europe.

Uses.—The most important use of nitrate of soda is as a fertiliser; it is also used commercially in the production of nitric acid. For agricultural purposes nitrate has had to meet the competition of sulphate of ammonia, another fertiliser much richer in available nitrogen. Synthetic nitrates are produced on a large scale in Norway by fixing the nitrogen from the air, and the industry has been largely developed in Germany since the outbreak of war. The question of the synthetic production of nitrogen compounds in the United Kingdom and Canada is receiving attention.

The Platinum Group of Metals.

This includes platinum, palladium, rhodium, osmium, and ruthenium. The first-named is of great industrial importance.

The average quantity of platinum imported into the United Kingdom during each of the years 1909 to 1913 was 41,000 ozs. troy; the average re-exports were 6,000 ozs., leaving 35,000 ozs. as the net quantity retained for use in the United Kingdom. Imports of platinum into the Dominions, whether in the form of unmanufactured metal or crucibles, &c., are small. Complete figures are not available, but there is ground for placing the total well under 2,000 ozs. a year. The trade returns of the United Kingdom show France as the country of origin of about 70 per cent. of the platinum imported, but this is mainly Russian platinum purchased for re-sale by a French company having large financial interests in the trade. Other countries whence platinum reached the United Kingdom are Russia and the United States of Colombia (direct), Germany, and the United States of America.

Russia furnishes about 95 per cent. of the world's supply of platinum, which before the war was estimated at from 250,000 to 300,000 ozs. a year; the Russian output is under Government control. The Colombian deposits, which were worked before those of Russia, are an important and growing source of supply. Small quantities of platinum are produced in the United States of America. Small amounts of platinum occur in the nickel-copper ores of Sudbury, Ontario. The matte obtained from these ores (which is exported for refining) contains platinum metals to the extent of from 0·17 to 0·5 oz. per ton, which is recovered by the Mond Nickel Company at Swansea, and (partially) in the works of the International Nickel Company, New Jersey, but the output of platinum from these sources does not exceed a few hundred ozs. annually. Attempts have been made to work platinum deposits in British Columbia, but these have not yet become a serious source of supply. Platinum is known to exist in various parts of Australia; a deposit has been worked intermittently in Victoria, and small quantities (610 ozs. in 1912) are raised in New South Wales. New Zealand also has a small production.

For many purposes, platinum is alloyed with iridium, a similar metal. An important source of this is osmiridium (a native alloy of iridium with osmium, a catalytic agent), which is now largely obtained from Tasmania, where production commenced in 1911. The output in Tasmania up to the end of 1915 was 3,700 ozs., valued at 32,000*l*. After the outbreak of war, production fell off considerably. Osmium and iridium are also found in New South Wales. Although the platinum metals have always been mainly obtained from alluvial deposits as native metals, large quantities are now obtained as a by-product in smelting operations, mainly in the final "mud" left from the electrolytic purification of gold, copper, and nickel ore. Although their amount is too small to justify their extraction except as by-products, the total amount recovered increases yearly and may prove to be of extreme industrial importance. The nickel ores of Sudbury yield more palladium than is obtained from all other sources. They also yield platinum and iridium, and the output of these three metals from the treatment of nickel matte could be very largely increased by taking the necessary precautions in refining. This is done in the Mond electrolytic refinering processes.

Uses.—As platinum is very infusible and not readily acted on by acids, it is of great importance for many chemical and scientific purposes (e.g., for making crucibles, weights, and vessels for concentrating acids). Its principal use is as a catalytic agent in making sulphuric acid, &c.; it has also important applications in the electrical industry, *e.g.*, for contact breakers, &c. For many of these uses no adequate substitute is known. Platinum has been used for many years in the production of jewellery, and in the preparation of dental plates, but is being replaced by palladium since the war.

Mercury (Quicksilver).

Quicksilver is not produced in the United Kingdom. During the five years, 1909–1913, the annual imports averaged 1,520 tons, and the annual re-exports 919 tons, so that the annual consumption in normal conditions may be estimated at 600 tons a year. The principal countries whence quicksilver is imported into the United Kingdom are Spain (annual average 1,196 tons), Italy (annual average 214 tons), and Mexico (annual average 45 tons); the United Kingdom is wholly dependent on sources of supply outside the Empire. The large proportion of re-exports is due to the fact that the principal Spanish mine (the Almaden) is controlled by Rothschilds, and all the output is marketed through London. Of the re-exports from the United Kingdom an annual average of 474 tons went to British Possessions, but shipments to Hong Kong (probably ultimately for China) account for over half this figure. The average annual imports into the Dominions (1909–1913) were as follows:—Union of South Africa 120 tons (chiefly from Austria-Hungary and Spain), Australia 50 tons (nearly all from Spain viâ the United Kingdom), Canada 80 tons (principally from United States of America and United Kingdom); New Zealand also imports annually a few tons of Spanish quicksilver from the United Kingdom. The total consumption in the Dominions may thus be put at about 250 tons a year.

The chief sources of the world's supply of quicksilver are Spain, with an annual output averaging nearly 1,300 tons (1909–1913), Italy (about 900 tons annual output), Austria-Hungary (nearly 800 tons), United States (over 700 tons). The United States output has fallen off greatly during the last 10 years, and whereas it was formerly (on balance) an exporting country, it has now become an importer of quicksilver. There is also a small output in Mexico. The total annual production of quicksilver in the world was estimated to have been 4,000 tons, or rather less, prior to the war.

Quicksilver ore (cinnabar) is not raised on a commercial scale in any of the Dominions. It is known to occur in various parts of Australia and some prospecting has been done, especially in Queensland, where extensive deposits of low-grade ore have been found in the Kilkevan district. Cinnabar has also been discovered in certain localities in New Zealand, but attempts made at different times to work the deposits have not been successful. Cinnabar has been raised to a small extent in British Columbia.

Uses.—Quicksilver is very largely used in the extraction of gold and silver from their ores. Another important use is in the production of fulminate for explosives, and the red oxide has recently been employed as a paint for ships' bottoms to prevent fouling. In addition, quicksilver has very numerous applications in science, *e.g.*, for electrical and physical apparatus, in the arts, and in medicine; for many of these uses no suitable substitutes are known.

Rock Phosphates (Phosphate of Lime, &c.).

Formerly considerable quantities of phosphate of lime were mined or quarried in the United Kingdom. Figures are available from 1874 onwards; they show that the output, which exceeded 250,000 tons in each of the years 1875 and 1876, had fallen in 1880 to 30,000 tons and in 1890 to 18,000 tons. It has now entirely ceased, owing to the imports of cheaper phosphate from the United States of America and North Africa, and to the increasing use of basic slag as a phosphatic fertiliser. The average annual imports of " phosphate of lime and rock phosphate " into the United Kingdom in 1909–1913 were 492,000 tons, of which 5,000 tons were re-exported. The imported rock phosphates are mainly used in the production of superphosphates and other compound fertilisers, and are to some extent re-exported in this form. The annual exports of superphosphates produced in the United Kingdom averaged 121,000 tons (1909–1913), of which about two-thirds went to foreign countries, and about one-third to British Possessions, especially Australia and New Zealand. Other phosphatic fertilisers, or materials for fertilisers, which are obtained in the United Kingdom from abroad are basic slag (net average annual imports, 1909–1913, 30,000 tons), bones (35,000 tons), and guano (20,000 tons). There is, however, also a large export of basic slag of United Kingdom production, the annual average being 193,000 tons. The bulk of this goes to the Continent, but New Zealand has been buying increasing quantities in recent years.

In the Dominions the chief consumers of phosphatic manures are the wheat-growing districts of Australia and New Zealand. During the five years 1909–1913, the imports of rock phosphates into Australia averaged 100,000 tons a year; nearly all of this came from Ocean Island (where large deposits are worked by the Pacific Phosphate Co.), and other islands in the Pacific, though small quantities are also recorded from Christmas Island. The bulk of the crude phosphates imported is retained in the Commonwealth, where a considerable industry is engaged in the preparation of fertilisers for use in Australia and for export. Imports of superphosphates averaged 46,000 tons annually in the same period; of this total 25,000 tons came from the United Kingdom and 15,000 tons from Japan; there is an annual export of from 10,000 to 12,000 of superphosphates prepared in Australia. Australia also imports guano from islands in the Pacific. The trade returns of New Zealand did not show separate statements of the imports of phosphates, &c., until 1914. In that year the imports were :—Basic slag, including Thomas phosphate slag, 37,000 tons (21,000 tons from the United Kingdom and 14,000 tons from Germany); guano and rock phosphates 21,000 tons (11,000 tons from the Straits Settlements—probably originally from Christmas Island—about 5,000 tons from islands in the Pacific, and smaller quantities from Madagascar and Australia); superphosphates 56,000 tons (mainly from the United Kingdom, Germany, the Netherlands, Japan, and Australia). Imports of superphosphates and crude phosphates into South Africa averaged 25,000 tons a year during 1909–1913; of this total Holland supplied 12,000 tons, and the United Kingdom and Germany about 5,000 tons each. No figures are available to show the quantities of phosphates, &c., imported into Canada and Newfoundland, but the consumption of phosphatic manures in these Dominions is very small.

The world's production of phosphate rock was estimated at nearly 7,000,000 tons a year before the war. Of this total the United States of America produced about 3,000,000 tons from the rich and easily worked Floridan deposits, whilst Algeria and Tunis together supplied about the same quantity. Other sources of supply are Ocean Island, Christmas Island, France, and Belgium. There is also a small but increasing output in Egypt. The production in the Dominions is at present inconsiderable. Canada formerly produced some 30,000 tons of phosphate of lime annually, but the output has now practically ceased. Rock phosphates are known to occur in certain parts of Australia and deposits in South Australia are being developed; difficulties in the way of marketing are being investigated by the Geological Survey Department there. There has also been some output of guano and rock phosphates from deposits on islands off the coasts of Western Australia. In New Zealand phosphate rock is obtained from deposits in Otago, the annual output being about 10,000 tons.

The figures given above show that the Empire is at present largely dependent on foreign sources for its supply of phosphates. There is not sufficient evidence to show whether workable deposits exist in sufficient quantities to render it self-supporting in this respect. As there is every reason to suppose that the great wheat-growing areas of Canada cannot go on producing grain indefinitely without the application of phosphatic and other manures, the question of future supplies is one of importance, but it involves technical inquiries into such points as the possibility of replacing superphosphates by basic slag, and as to whether sufficient quantities of the latter would be available. Generally, the whole matter of the Empire supplies of all fertilisers, including not only phosphates but sulphate of ammonia, cyanamide, potash, and other necessities of plant life, merits expert investigation.

Uses.—The chief use of rock phosphate is in the production of agricultural fertilisers; it is used to a small extent directly for this purpose, but in order to improve its manurial value and to render it soluble in water it is usually converted into super-phosphates by treatment with sulphuric acid, &c. Rock phosphate also forms the basis of sundry special compound manures. Phosphorus and its compounds are also obtained from phosphate rock.

Sulphur.

The average annual imports of crude sulphur into the United Kingdom in the period 1909–1913 were 408,000 cwts., of which 395,000 cwts. came from Italy.

The average quantity of sulphur re-exported from the United Kingdom was 38,000 cwts., largely to the United States of America, Canada, and South Africa. Considerable amounts are also imported into the Dominions; the average annual imports into Canada in the period stated were 484,000 cwts., of which the United States of America supplied 354,000 cwts., Japan 64,000 cwts., Italy 30,000 cwts., and the United Kingdom 31,000 cwts. The Australian imports averaged 444,000 cwts., of which 244,000 cwts. came from Japan and 195,000 cwts. from Italy. New Zealand imported 35,000 cwts. (annual average), about two-thirds of which came from Japan. The imports into the Union of South Africa averaged 359,000 cwts.; of this total Spain supplied 163,000 cwts., Italy 155,000 cwts., and the United Kingdom 38,000 cwts.

The amount of native sulphur produced in the world before the War was estimated to be about 780,000 tons a year, of which Sicily produced 370,000 tons and the United States of America 280,000 tons, the remainder representing mainly the output in Japan and

Spain. There is no production of crude sulphur on a large scale in any of the Dominions. Considerable deposits exist on White Island, Bay of Plenty, New Zealand, but no export has taken place since 1902. In the five years preceding that date nearly 100,000 cwts. were shipped. Recent attempts to work the deposits have been unsuccessful, owing to various accidents. At Rotorua, however, small deposits of sulphur are being worked for the manufacture of sulphuric acid in the Dominion itself.

The figures given above relate to native sulphur, but sulphur and sulphuric acid are also obtained largely from pyrites; in fact it is estimated that between 90 and 95 per cent. of the sulphuric acid manufactured in the United Kingdom is obtained from pyrites. This is commonly cupriferous, and after roasting to remove the sulphur is washed to recover the copper and precious metals, if present. The final residue of iron oxide is sold for various purposes, including smelting down for pig iron, so that the British pyrites industry is not merely in connection with sulphuric acid manufacture. Imports of iron pyrites (chiefly cupreous) into the United Kingdom averaged 828,000 tons in the five years 1909–1913. Spain supplied 572,000 tons, Norway 106.000 tons, and Portugal 76,000 tons. The only imports recorded from British Possessions were from Newfoundland, with an annual average of 27,000 tons. There is a very small output from mines in the United Kingdom and also from the recovery of alkali waste; there is also some production of pyrites in Canada (averaging in 1909–1913 about 72,000 tons a year),* but for pyrites as well as for native sulphur the Empire is mainly dependent on foreign sources of supply. Very large deposits exist in Eastern Canada, but working hitherto has been on a relatively small scale.

Uses.—Sulphur is used for the production of sulphuric acid, which has very wide industrial applications. Sulphur is also a constituent of gunpowder, insecticides, and is utilised in the preparation of many important chemicals and for vulcanising rubber.

Thoria and the allied rare earths.

The rare earths include the oxides of the metals thorium, cerium, didymium, lanthanum, and other rare metals. They form constituents of the mineral monazite, which is a phosphate of those metals; and they also occur in the mineral thorianite found in Ceylon (an extremely rich thorium mineral), in thorite, cerite, and many other minerals. Only monazite and thorianite are of commercial importance, and the former is now practically the sole source of thoria.

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* This figure had risen to over 260,000 tons in 1915; in the same year Canada exported about 8,600 tons of sulphuric acid as compared with only 3,300 tons in 1914.

Practically, the only important use of thorium is in the manufacture of incandescent gas mantles, which are composed mainly of thoria (thorium oxide), obtained by saturating a textile fabric in a solution of thorium nitrate and "burning off." No specific information is available as to the consumption of thorium nitrate in the United Kingdom, but the estimated consumption of gas mantles during the year 1913 amounted to about 70 millions,* of which probably 40 millions, or slightly less, were imported from Germany. In addition to the thoria contained in imported mantles, thorium nitrate to the value of 41,000*l*. was imported. From investigation of various mantles it appears that the average content of thoria is about ·5 gram per mantle. The amount of thoria required per annum for the entire consumption of the United Kingdom is somewhat over 34 tons, or, if we take the mantle consumption of the Empire as 100 millions per annum, the amount of thoria required is about 49 tons.

Monazite sand is only found in commercial quantities in Travancore (India) and in Brazil. There are also deposits in Ceylon and in Carolina, and the alluvial tin deposits of the Straits Settlements, Malay, and Nigeria also yield monazite, but these sources are not of present importance. The crude sand is concentrated by the concessionaries and the final concentrate, known as monazite sand, or more commonly as monazite, is sent to Europe and the United States, where it is treated chemically with production of thoria, ceria, didymia, &c. (the oxides of the above metals).

Although ceria is the main constituent of monazite as regards quantity, the more important constituent, from the commercial point of view, is thoria. Both monazite and thorianite are sold on the basis of their thoria contents only.

The monazite industry in Brazil has been hampered by the imposition of a 50 per cent. *ad valorem* duty on the exports from all its principal (coastal) deposits, and by fixing prohibitive duties or restrictions on the associated minerals (zircon, &c.), which are obtained during the dressing of the sands in Brazil. The export of monazite from Brazil has gradually decreased from 6,462 metric tons in 1909 to 1,437 metric tons in 1913. The average content of Brazilian monazite is 4 to 7 per cent., so that the output of thoria from this source in 1913 was about 70 tons (allowing for a recovery of 90 per cent.).

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* The figure most commonly given for the consumption of gas mantles in the United Kingdom is 100 millions, but there is good reason to believe that this is an over-estimate.

The output of the Travancore deposits in the four years preceding the War averaged 1,300 tons per annum, and the contents of thoria about 8 to 9 per cent., or about 100 tons. In addition to the original concession a 20 years' lease to work 150 acres for monazite has been recently taken up by a British firm (Thorium Ltd.), but no sand had at a recent date been exported from this concession.

The entire output of the Travancore deposits was before the war sold to the Auer Gesellschaft of Berlin, but is now exported to the United Kingdom and the United States, and of the Brazilian deposits a large part was sold to the German Thorium Syndicate (Sthamer, De Haen, Knoeffler, Kuhnheim, and the Austrian Welsbach Co.), who, together with the Auer Gesellschaft, controlled the price of thorium nitrate.

There are now at least three, possibly four, firms extracting thorium nitrate from monazite in the United Kingdom, and while it is not possible to give precise figures as to their output, it is estimated that this output does not exceed 20 tons of the nitrate per annum. This is equivalent to about 20 million mantles per annum. The manufacturing capacity of these firms is probably considerably greater than the output.

The production of thorium nitrate results in a large quantity of by-products, including ceria and didymia, from which pyrophoric alloys are obtained. These are used in place of matches, &c., and as igniters for fuses, &c., and are increasingly used both for domestic, industrial, and war purposes.

The dressing of the crude monazite (prior to the chemical treatment) separates zircon as a by-product. Zircon is in small demand for the manufacture of enamels and of refractory furnace linings, &c.

Note on the control of the Travancore Deposits. These deposits were discovered in 1909 by a mining prospector named Schomberg, who leased the concession to the London Cosmopolitan Mining Co., who were unable to obtain in this country the money to work them. The Travancore Minerals Co. were finally formed to work the deposits, it being a condition of the original concession that it could only be transferred to a British Company. At the outbreak of war the whole of the preference shares and 11,000 ordinary shares in the Travancore Minerals Co. were held in trust for the Auer Gesellschaft of Berlin. The main new conditions laid down for the continuance of the concession are that all seven directors (one of whom is to be nominated by the Secretary of State for India) must be English born, that the capital is increased from 40,000*l.* to 100,000*l.*, the British holding increased and the German contracts cancelled. The following undertaking has been accepted in respect of future transactions:—

> "The Company will be ready at all times to sell monazite sand direct at a fair price to any *boná fide* British firm that may desire to purchase the material in reasonable quantities for the purpose of manufacture. The Company further undertake that they give no preference in the matter of price to any purchaser of very large quantities, but that the price per ton for all purchases of lots of 10 tons and upwards shall be the same, free at the mine. The Company clearly understand that if in the opinion of the Secretary of State for India the control of the Company has passed at any time out of British hands, or if in the Secretary of State's opinion there is grave danger at any time of British control being lost or jeopardised, or in the event of any breach of this undertaking, power is reserved to cancel the concession."

Tin.

The annual production of tin in the world prior to the War was from 120,000 to 125,000 tons. During the five years 1909-13 it averaged 118,000 tons, whilst in 1913 the figure was 127,000 tons, made up as follows:—

	Tons.
British Malaya	64,600
United Kingdom from native ores ...	5,200
United Kingdom from imported ores ...	14,000
Australia	4,800
Nigeria	4,500
Germany	11,300
Dutch East Indies	17,100
China	5,800

About 8,500 tons of the tin smelted from imported ores in the United Kingdom, and practically all the German production, was from Bolivian tin ore.

The production of tin from Empire ores smelted in the United Kingdom may be estimated at 2,500 tons. The production of tin in the British Empire was therefore about 81,500 tons, or 65 per cent. of the world's output.

The consumption of unwrought tin in the United Kingdom probably averaged about 21,000 tons per annum, whilst that of the remainder of the Empire may be estimated at about 6,000 tons, giving an Empire consumption of 27,000 tons, or about 21 per cent. of the world's supply.

The consumption of unwrought tin in foreign countries would therefore appear to be about 100,000 tons, whilst the production outside the Empire is only 45,500 tons. Thus foreign countries are dependent on the Empire to the extent of nearly 55 per cent. of their supplies.

This figure, however, does not represent the whole case, for nearly all the tin consumed is used in the manufacture of tinplate. The estimated amount of tin in the tinplate exported from the United Kingdom averaged 17,000 tons per annum, of which only 4,000 tons went to other parts of the Empire, giving a figure of about 13,000 tons to foreign countries. The imports of tinplate into the Empire from foreign sources represented only about 1,500 tons of tin, giving a net export to foreign countries of tin in tinplate of 11,500 tons.

Taking this figure into consideration, it would appear that the consumption of tin of Empire production in foreign countries was about 66,000 tons per annum out of a total consumption in these countries of 111,500 tons, *i.e.*, foreign countries were dependent on the Empire to the extent of nearly 60 per cent. of their total requirements of tin.

Information as to the tin mining industry of Australia and South Africa will be found on pp. 95 and 106–7 of this Report.

Tungsten.

The imports of tungsten, tungsten ores, and alloys containing tungsten are not separately recorded in the trade returns of the United Kingdom, and no official figures of consumption can be traced.

Tungsten occurs in a considerable number of minerals, but the only ones which are dealt with on a commercial scale are wolfram and scheelite. The term wolfram commonly includes the varieties (containing almost the same proportion of tungsten) known as hubnerite and ferberite. These minerals vary considerably in composition and merge into each other; for instance, no hubnerite occurs in quantity without containing some iron, and no ferberite without some manganese. In practice also the terms are not used uniformly. Scheelite occurs in considerable quantities, and its exploitation is rapidly increasing, although it is much less common than wolfram. Until recently it fetched a lower price than wolfram, partly because impurities which are difficult to remove are more common in scheelite than in wolfram, and partly from a trade prejudice which has now almost disappeared. Scheelite is likely to be in increasing demand as compared with wolfram, as metallurgical treatment progresses.

Wolfram is mined in the United Kingdom, mainly in Cornwall, and some small quantities of scheelite are raised in Cornwall. During the five years, 1909–1913, the output of these ores in the United Kingdom averaged 260 tons a year—only about 4 per cent. of the world's total production. Tungsten ores are treated by water concentration, and, if associated with tin, are passed through a magnetic separator. The concentrates (averaging from 60 to 70 per cent.) are sold on the basis of the percentage of their metallic content in terms of tungstic acid. The average from the Cornish mines ranges from 60 to 70 per cent.

The following particulars of the estimated annual average output (1909–1913) of the various tungsten ores in the principal producing countries are based on information from an American source, viz. :—

	Tons.*
United States (wolfram and scheelite) ...	1,300
Burma (wolfram)	1,200
Australia (wolfram and scheelite) ...	1,100
Portugal (wolfram)	1,000
Argentine (wolfram)	700
Bolivia (wolfram)	300
Japan (wolfram and scheelite)	240

In addition to these sources of supply, wolfram and scheelite are both found in the Federated Malay States. The output of the former is estimated at 700 to 750 tons, and of the latter 200 tons, for 1917. New Zealand also produces scheelite, and the exports from the Dominion averaged 140 tons a year during the period 1909 to 1913. In 1914 the export of scheelite concentrates was 204 tons, and in the following year 194 tons; in spite of the high price and certainty of market the output fell off in 1916. Small quantities have also been raised in Nova Scotia and New Brunswick. Wolfram is also mined in Spain, and hubnerite in Peru. It should be noted that a large proportion of imported ores contain tin-stone and have to be electro-magnetically separated. This fact should be allowed for in considering statistics of tungsten ores.

Tungsten ores occur widely in different parts of Australia, many of the deposits being unworked. They have also been noted in various places in Canada. Development in the past has probably been hindered by fluctuation in price : between 1897 and 1914 it varied between 9*s*. and 51*s*. a unit, the highest price being recorded in 1907.

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[*] The output is expressed in terms of tons of ore containing 60 per cent. of tungstic acid. It should be noted that the output increased during the period stated and the average is to be regarded as an under-estimate of the normal consumption immediately before the War.

Before the War Germany was the chief producer of metallic tungsten and tungsten alloys; she exported about 800 tons of tungsten metal annually. By purchasing and treating low-grade ores, which British firms would not touch, Germany acquired control also of most of the supplies of the best ore. The net imports of tungsten ores into Germany in the five years 1909 to 1913 averaged 3,600 tons a year; rather more than half of this came from British sources, especially Burma, Australia, and New Zealand. Practically the whole of the supply of tungsten for the manufacture of high-speed steels in the United Kingdom was derived from Germany before the War; on the cessation of this supply the Sheffield manufacturers formed a company (High-Speed Steel Alloys, Limited) with a factory at Widnes, which has been successful in producing tungsten metal from ores imported from Burma and other sources, and steps were taken to control, on the part of His Majesty's Government, the whole of the available supply of tungsten ores from Australia, New Zealand, the Federated Malay States, and Burma. The whole of the output of ore within the Empire was commandeered by the Government, and a maximum price of 55*s.* per unit of tungstic acid per ton was fixed. The enormous increase in the price of tungsten ores in the United States, following the demand for high-speed cutting steel to fulfil war requirements, has resulted in the production in the United States being increased from three to four times the pre-war figures. The output of tungsten in the Empire is probably equal to the demand. There are two firms in the United Kingdom making tungsten powder.

Uses.—The chief use of tungsten in the form of tungsten powder (metal) or ferro-tungsten (alloy), which is also made in England and France, is in the manufacture of special high-speed tool steels; the best tungsten steel will contain up to 20 per cent. of metallic tungsten. It is also used for filaments for electric lamps, in various surgical, dental, and other instruments, and in other less important uses.

Zinc (Spelter).

Ores of zinc, combined with lead, are fairly widespread in the United Kingdom, though the precise extent of the deposits is not known, but the output of ore is not considerable. Almost all the native ore was exported for treatment, and the spelter produced in the United Kingdom is smelted from imported ores; the average annual import of ores during the years 1911 to 1913 was 69,000 tons. The estimated consumption of spelter in the United Kingdom in 1913 was 194,000 tons

Figures (estimated by the Metallgesellschaft of Frankfort) of production of spelter in 1913 are as follows:—

United Kingdom	58,000 tons
Australia	3,500 ,,
United States	315,000 ,,
Germany	279,000 ,,
Belgium	194,500 ,,
France and Spain	70,000 ,,
Holland	24,000 ,,
Austria, Italy, Russia, Norway ...	38,000 ,,
	982,000 ,,

Before the War the output of spelter in Europe was controlled by the Spelter Convention, formed in 1909 and elaborated in 1910. It consisted of—

Group A.—The Zinkhüttenverband, comprising the Associated German and Belgian makers, whose output was regulated and disposed of by a joint selling office.

Group B.—Certain Belgian and French producers.

Group C.—The British producers.

Members of the last two groups (comprising the International Zinc Works Union) sold independently, but were bound to a regulation of output. When stocks amounted to 50,000 tons, or the average London price had been for two months below 22*l.* a ton, the restriction came into force.

Ores.—Zinc is obtained mainly from blende (natural sulphide) and calamine (natural carbonate). A less important source is the silicate. Calamine was formerly the most important ore of zinc, but at the present time blende is the chief source of the metal; as marketed, this usually contains 30 to 35 per cent. of zinc, the balance consisting of iron sulphide and other impurities. Silver and cadmium frequently exist in sufficient quantity to be profitably extracted.

Improvements in the wet dressing, flotation, and other processes of mechanical concentration have, within recent years, permitted the utilisation of low-grade and complex sulphide ores of zinc. In particular may be mentioned the refractory ores of Broken Hill, N.S.W., where the blende exists in intimate association with galena (lead sulphide).

Calamine, when pure, contains 52 per cent. of zinc, but is usually associated with oxide of iron and carbonate of lime. Silesian ores are mostly low-grade calamines, but are successfully smelted locally. The silicates, which are generally associated with calamine, are, in commerce, included under this name. Franklinite, a complex ore containing iron, manganese, and zinc, is found in New Jersey. The zinc, which may reach 21 per cent., is extracted by volatilisation as zinc white (oxide of zinc), and the manganiferous residue smelted in blast furnaces for the production of spiegeleisen.

The chief sources of supply of zinc ores (including concentrates) are the United States of America, Australia, Germany, Spain, Algeria, and Tunis. Figures of the output of zinc ore in 1913, so far as they are available, are as follows:—

	Tons.	
United States of America ...	700,000	(estimated)
Silesia	627,000	
Australia	500,000	(average production)
Spain	175,000	(estimated average)
Algeria and Tunis	118,000	
Poland	165,000	

Other producing countries are Mexico (18,000 tons in 1913, 105,000 tons in 1909), France (45,000 tons), Greece (50,000 tons), China and Japan (53,000 tons), Canada, mainly British Columbia (7,500 tons), the United Kingdom, and Belgium. It must be observed that these figures are not really comparable, as the zinc content of ores in different countries varies considerably, thus the Silesia ores contain far less zinc than those of Australia.

The Australian Deposits at Broken Hill, N.S.W., form the most important source of zinc in the British Empire. The ore consists of a complex mixture of lead, zinc, and silver, from the treatment of which is obtained a zinc concentrate containing an average of, say, 46 per cent. of zinc with a few per cent. lead and a lead concentrate still containing up to 8 or 10 per cent. zinc. Except for a small quantity smelted at Port Pirie, and about 20,000 tons exported to be smelted at Seaton Carew, Durham, the whole of the zinc concentrates, about 500,000 tons annually, was sold under contract to smelters in Belgium and Germany. In addition to the ore mined annually, there are large quantities of tailings available (some of which are being worked) which contain about 17 per cent. of zinc.

Zinc ore has for many years been raised in British Columbia, and there has also been some output in Quebec and Ontario. The total production of ore in Canada in 1915 was estimated at 14,000 tons, containing about 5,500 tons of zinc. Before the war the British Columbian ores were shipped to smelters in the United States, but zinc recovery plant is now working at Trail, B.C. (*see* below).

An important deposit of zinc-lead-silver ore is known to occur at Bawdwin, Upper Burma, and this district may in the future become an important source of zinc. The deposit, which is rich in silver and remarkably free from silicious gangue, is being actively developed at the present time.—*See* under "Lead," p. 432.

In Broken Hill, Rhodesia, there exists a very large deposit of an oxidised ore—a complex mixture of lead and zinc carbonates and silicates, the successful treatment of which is a problem for the future metallurgist.

Tasmania also possesses large deposits of complex ores.

Taking the spelter consumption of the British Empire under normal conditions at a little over 200,000 tons, then with an average zinc content of 45 per cent and an estimated recovery of 85 per cent., the output of the sources at present being worked within the Empire would be sufficient to supply this consumption.

Progress since the outbreak of war.—Before the War zinc-smelting plants were in excess of the world's requirements, but the immediate effect of the War was to increase the demand for spelter. At the same time, owing to the inadequate smelting facilities in the United Kingdom, there was a shortage of supply, so that the price rose from an average of 21*l.* 6*s.* per ton in June, 1914, to an average of 100*l.* 12*s.* 3*d.* per ton in June, 1915. Australia was in the meantime deprived of a market for concentrates; the output in 1914 amounted to only 359,310 tons, a decrease of 147,356 tons on the previous year.

The situation has been eased by a large increase in the spelter output of the United States. The production amounted to 346,676 (short) tons in 1914, 216,532 (short) tons in the first half of 1915, 272,987 (short) tons in the second half of 1915, and 316,452 (short) tons in the first half of 1916. The smelting capacity of the United States will probably exceed 650,000 tons or over two-thirds of the world's normal output.

In Australia a co-operative association, the Zinc Producers' Association Py., Ltd., has been formed, the members of which are pledged to sell the whole of their output of marketable ore, concentrates, spelter, or electrolytic zinc, through the medium of the Association for a period of 50 years.

The Imperial Government has agreed to purchase 100,000 tons of Australian concentrates and 45,000 tons of Australian spelter per annum for a period of 10 years.

The Australian Electrolytic Zinc Company has been formed for the treatment of concentrates. Contracts for electrical power have been arranged with the Tasmanian Government. Steps have also been taken to enlarge the smelting works at Port Pirie, N.S.W., so that they will have a capacity of 4,000 tons of concentrate per week, and the Mount Lyell Co., Tasmania, is undertaking the treatment of the West Coast mixed sulphide ores.

In addition, as the result of arrangements with the Government, two companies at least, the Swansea Vale Spelter Co., Ltd., and the Central Zinc Co., Seaton Carew, or works associated with the Sulphide Corporation, have arranged to double their capacity.

Smelting works have been established by the Consolidated Mining and Smelting Co., at Trail, B.C., to treat the local ores. In the autumn of 1916 these works had an output of 15 tons of zinc a day, but extensions were then in progress. Other works for the recovery of zinc are being established in Canada.

But in spite of these steps it must be recognised that the zinc smelting capacity of the Empire is still considerably below the consumption.

Uses.—The galvanized iron industry probably accounts for about 60 per cent. of the normal consumption of zinc, and the manufacture of brass about 20 to 25 per cent. Rolled zinc sheets are used for roofing, for screens and sieves, and in photographic reproduction processes; rolled zinc plates are used in marine boilers to prevent corrosion; zinc rods are important for electric batteries; and zinc dust (a by-product in the distillation of zinc ores) is employed in gold extraction, in the dyeing and textile industries, and in the galvanizing process known as sherardizing.

The most important zinc alloys, in addition to brass and bronze, are various anti-friction metals, and aluminium zinc, which is largely used for light castings in the motor industry. Zinc oxide (zinc white) is largely used as a pigment, and to some extent in the rubber and linoleum industries and medicine. Zinc sulphate is used in the manufacture of lithopone, a largely used pigment, which is obtained from a mixture of barium sulphate and zinc sulphide.

(B.) Other Commodities.

Butter.

The production of butter in the United Kingdom in normal times has been estimated at about 2,500,000 cwts. per annum. The average net imports (1909-13) were 4,067,000 cwts., giving a consumption of about 6½ million cwts. The total imports were 4,167,000 cwts. per annum, of which 946,000 cwts., or 23 per cent., were from Empire sources, and 3,221,000 cwts., or 77 per cent., from foreign countries. The following statement shows the chief sources of supply:—

Imports from:—	Cwts.
Australia	621,000
New Zealand	304,000
Canada	21,000
British Empire	946,000
Denmark	1,704,000
Russia	652,000
Sweden	337,000
France	288,000
Netherlands	135,000
Other Foreign Countries	105,000
Total Foreign Countries	3,221,000
Total	4,167,000

Out of a consumption of 6½ million cwts. in the United Kingdom, therefore, about 3½ million cwts., or 54 per cent. of the total, was produced within the Empire, the principal parts of the Empire from which butter is imported being Australia and New Zealand, with Canada coming next.

As regards future supplies, the total exports of butter from Australia, New Zealand, and Canada in 1909–13 (average) were:—

	Cwts.
Australia	692,000
New Zealand	346,000
Canada	33,000
Total	1,071,000

It should be noted, however, that formerly the exports of butter from Canada were very large, averaging during 1901–05 about 305,000 cwts., whereas by 1913 the trade had dwindled to about 10,000 cwts. In the first period the United Kingdom received about 250,000 cwts. a year, but by 1913 the trade with the United Kingdom had practically ceased. The trade has revived to some extent since the War, and the United Kingdom imported about 102,000 cwts. from Canada in 1916. New Zealand has also increased her export trade in butter to some extent since the War, the total exports in 1916 amounting to over 400,000 cwts. Australia, on the other hand, has largely curtailed her export of butter during the last two years.

On the whole it seems doubtful whether the supplies of butter of Empire production available for consumption in the United Kingdom could be made to exceed 4½ million cwts. at the utmost. If the consumption remains at about 6½ million cwts., the deficiency to be supplied from foreign countries would be about 2 million cwts., or about 30 per cent., as against over 45 per cent. in 1909–13. The deficiency could undoubtedly be met by an increased production of margarine, the materials for which exist in adequate quantities within the Empire.

The only other part of the Empire requiring to import butter to any considerable extent is South Africa. The dairying industry in the Union is, however, developing, and will probably soon be in a position to supply home requirements and even to export to some extent. Some idea of the position of affairs in that Dominion may be gathered from the fact that whereas in 1908 some 67,000 cwts. were imported, in 1912 the figure had fallen to 22,000 cwts., and in 1916 it probably did not exceed 4,000 cwts. On the other hand, the exports of butter of home production had grown by 1916 to about 1,000 cwts.

Cheese.

The annual production of cheese in the United Kingdom may be estimated at about 600,000 cwts. The total imports (average 1909–13) amount to 2,360,000 cwts., and the total exports to 70,000 cwts., giving a consumption of some 2,890,000 cwts. Of the imports, 1,926,000 cwts., or 82 per cent., were from Empire sources, and 434,000 cwts., or 18 per cent., from foreign countries. The following statement shows the chief sources of supply:—

Imports from :—	Cwts.
Canada	1,459,000
New Zealand	462,000
Other parts of the Empire	5,000
Total British Empire	1,926,000
Netherlands	257,000
Italy	86,000
United States	57,000
Other Foreign Countries	34,000
Total Foreign Countries	434,000
TOTAL	2,360,000

It would, therefore, appear that of a total United Kingdom consumption of nearly 3 million cwts., more than 2½ million cwts., or 85 per cent., was of Empire production, Canada alone supplying about 50 per cent. of the total.

In this connection it may be noted that the total exports of cheese from Canada during the five years 1909–13 average 1,474,000 cwts., as against 2,200,000 cwts. in the five years 1901–05. The figure for 1916 reached 1,500,000 cwts., almost the whole of which was shipped to the United Kingdom.

The exports from New Zealand have grown considerably during the last few years. In 1906 they amounted to 131,000 cwts., in 1910 to 452,000 cwts., in 1913 to 612,000 cwts., and in 1916 to probably at least 1,000,000 cwts. In the case of Australia it would appear that there is not always a surplus available for export. In 1912, for example, there was a *net import* of about 2,500 cwts., whilst in 1913 there was a *net export* of 11,000 cwts. During the quinquennium 1909–13 there was an average net *export* of only 4,000 cwts. per year. On the whole, therefore, Australia may be considered as self-supporting in the matter of cheese, but must be left out of consideration as a source of supply for the rest of the Empire.

South Africa is an importing country so far as cheese is concerned, the imports in pre-War years averaging about 50,000 cwts. per year. In 1915 the figure declined to 35,000 cwts., and in 1916 it probably did not exceed 20,000 cwts. In view of the developing dairying industry of the Union it is probable that before long that Dominion will be independent of the import trade in cheese, and may eventually be in a position to export.

India is the only remaining portion of the Empire which needs to import cheese in any quantity, the imports during the last few years amounting to about 12,000 cwts. a year.

To sum up, it appears that the surplus supplies from Canada and New Zealand, which last year almost certainly amounted to more than 2½ million cwts., are quite sufficient to cover the deficiency in the United Kingdom and other parts of the Empire where home production does not cover consumption. It is, moreover, not improbable that the production of cheese in the United Kingdom could be increased beyond the figure of 600,000 cwts. mentioned above.

Cotton.

The main difficulty in a statistical estimate of cotton production and consumption lies in the extreme variation in quality of different growths of cotton; some only of these varieties are suitable for the spinning industry of the United Kingdom. A characteristic feature of this industry is *fine spinning* which is shown by the fact that with about 40 per cent. of the world's supply of spindles the cotton consumption of the United Kingdom is only about 20 per cent. of that of the world; while at the other extreme, India and Japan, with only 6 per cent. of the world's spindles, consume 16 per cent. of the world's supply of cotton. No statistics are available as to the particular grades of cotton imported into the United Kingdom; the grades suitable for fine spinning are Sea Island (American), Egyptian, and the better qualities of American. Indian cotton is generally only suitable for coarse spinning.

During the five years 1909–13 the gross imports of raw cotton into the United Kingdom averaged 2,290 million lbs. a year, of which 90 million lbs. (3·9 per cent.) was received from British Possessions and Protectorates other than Egypt, 74 million lbs. (3·2 per cent.) from British India, 397 million lbs. (17·3 per cent.) from Egypt, and 1,725 million lbs. (75·3 per cent.) from the United States. Re-exports amounted to 282 million lbs., giving the consumption as 2,008 million lbs. The amounts retained for consumption in the United Kingdom were:—American, 1,554 million lbs. (77·3 per cent.); Egyptian, 289 million lbs. (14·3 per cent.); Indian, 42 million lbs. (2·1 per cent.).

The cotton production of the Empire, including Egypt, is estimated at 2,505 million lbs. per annum. The main sources of supply are as follows:—

	Mill. Lbs	
India	1,735	Only a small quantity is useful for the industry of the United Kingdom.
Egypt	750	Mostly high grade; very suitable for fine spinning.
West Africa	4	Similar to American.
East Africa, Uganda, and Nyasaland	11	Similar to Texas.
West Indies	2	Very slightly below Sea Island quality.
Cyprus	3½	Harsh and short, only suitable for coarse yarns.

The import of foreign-grown cotton into other parts of the Empire is not considerable, amounting in all to 87 million lbs. of American cotton and 4½ million lbs. of other foreign cotton. Of the American cotton, 77 million lbs. was imported into Canada.

The exports of cotton from the Empire to foreign countries amounted approximately to 1,268 million lbs., of which 894 million lbs. was from India, 369 million lbs. from Egypt, and nearly 4 million lbs. from East Africa. Neglecting the Indian cotton, the Empire-grown cotton, possibly suitable for the industries of the United Kingdom and at present exported from the Empire, thus amounts to about 373 million lbs., or 16 per cent. of the present consumption. It should be borne in mind, however, that the production of cotton in the Empire is increasing owing to the efforts of the British Cotton Growing Association, and that while the increase is at present only slight in proportion to our needs, the position outlined above is not necessarily static.

Pitwood.

The consumption of pitwood in the United Kingdom during the five years 1909–13 was about 3¾ million tons per annum. In 1913 it was roughly 4¼ million tons. The home-grown timber consumed amounted to about 750,000 tons, the remainder being imported. In the years 1909–13 the average imports were as follows :—

	Loads.
Total imports	2,945,000
Of which from—	
Russia	1,265,000
Sweden and Norway	446,000
France	820,000
Spain and Portugal	392,000

(1 load roughly equals 1 ton.)

As none was imported from other parts of the Empire, it will be seen that for at least 80 per cent. of its supply of pitwood the United Kingdom is dependent on foreign countries.

On the outbreak of war it became evident that the supply, particularly from the Baltic, would be curtailed, and enquiries were, therefore, made with a view to ascertaining whether some part of the deficit could not be made up by obtaining supplies from Newfoundland and Canada. The Board of Trade representative on the mission of enquiry reported that there is an almost inexhaustible quantity of timber in certain parts of Newfoundland and the Maritime Provinces of eastern Canada, much of which could be made available for pit-props, being of the right kind and quality. The real factor as to quantities procurable from these sources resolves itself into a question of cost of carriage. It was estimated that the quantity of pitwood available from Canada and Newfoundland in 1915 would be :—

	Cords.
From Newfoundland	37,500
„ Cape Breton	5,350
„ Nova Scotia	50,000
„ Quebec	124,000
„ Ontario	170,000
Total	386,850, say, 950,000 tons.

On the other hand, the imports of pitwood into the United Kingdom from Empire sources in 1915 was not quite 100,000 loads (or tons), of which 86,000 were from Newfoundland, and most of the remainder probably from Canada.

As regards future supplies, it has been estimated that Newfoundland could eventually supply at least 300,000 cords (say 750,000 tons) annually and Canada probably much more.

There is a small consumption of mining timber in Canada itself. In 1910 Canadian mines used 53 million linear feet of pit-props and 22½ million board feet of sawn timber.

The use of steel and concrete props in substitution for timber is extending, especially in main roads and airways underground, and since the War began the use of home-grown timber has largely increased.

Wheat.

The production of wheat in the Empire during the five years 1909 to 1913 averaged about 705 million bushels a year, made up as follows:—

	Mill. Bushels.
United Kingdom	59·6
British India	356·6
Canada	184·3
Australia	90·5
New Zealand	6·9
South Africa	5·0
Newfoundland	—
Cyprus	2·0
Rest of Empire	—
Total	704·9

The estimated consumption, based on the figures of production, imports, and exports, is about 736 million bushels, and, therefore, the deficit, which would have to be made up by imports from non-Imperial sources, is 31 million bushels (16½ million cwts.), or 4·2 per cent. of the total consumption.

The United Kingdom is the only portion of the Empire which needs to import wheat and wheat flour for her use to any considerable extent. In the five years under review, the imports of wheat and wheat flour (in equivalent of grain) for consumption in the United Kingdom averaged 117½ million cwts., of which 54½ million cwts. were from other parts of the Empire and 63 million cwts. from foreign sources. The other importing countries of the Empire, viz., South Africa, Newfoundland, British West

Indies, and British West Africa, derive most of their supply from Imperial sources, their imports from foreign countries being probably not greater than 1 million cwts.

Thus the total deficit of importing countries is 64 million cwts.

On the other hand, certain parts of the Empire, viz., Canada, Australia, and British India, are large exporters of wheat to foreign countries. According to the official trade returns of these Dominions, the average annual exports to places outside the Empire were as follows:—

	Mill. Cwts.
Canada	6
Australia	7½
British India	7½
Total	21

This figure does not, however, represent the true state of affairs, as the returns referred to seem to show that much more Canadian, Australian, and Indian wheat is exported to the United Kingdom than is recorded in the United Kingdom returns as being received in this country from those sources. The difference is probably accounted for by the fact that cargoes of wheat leave Canada, &c., consigned "United Kingdom for orders." These consignments are apparently credited to the United Kingdom in the Canadian, &c., returns, but are often diverted to other destinations before reaching this country, and are therefore not a part of the actual wheat supply of the United Kingdom.

Making allowance for this, the real exports from the Empire to foreign countries would be approximately as follows:—

	Mill. Cwts.
From Canada	28
,, Australia	13
,, British India	8
Total	49

If this 49 million cwts. of wheat were retained in the Empire only about 15 million cwts. (*i.e.*, 64 – 49) need be imported from foreign sources.

On the whole it seems probable that the Empire in normal years could supply her own requirements in wheat to the extent of about 96 per cent., being dependent on foreign supplies to the extent of only 4 per cent., or some 15–16 million cwts.

In this connection it should be noted that the Australian supply is liable to severe fluctuations. Thus, in the season 1902–3, and again in 1914–15, the Australian crop was almost a complete failure owing to the drought. In consequence of this the imports of wheat and wheat flour into the United Kingdom from Australia, which normally are about 12½ million cwts., in the years 1903 and 1915 practically ceased, whilst Australia had to import fair quantities of wheat from foreign countries to make up the deficit in home supplies.

In years, therefore, when drought in Australia causes a considerable drop in the supplies available from that Dominion, the dependence of the Empire on outside sources would be much greater than 4 per cent. It is, of course, not possible to estimate what the deficit would actually amount to in such a case, but the following figures give a rough idea of the possibility:—

	Mill. Cwts.
Normal deficit as estimated above	15½
Deficit in United Kingdom supply from Australia ...	12½
Quantity required to be imported into Australia to make up deficit in home supplies (say)—	5
Total .	33

or 8½ per cent. of the total requirements of the Empire.

Wood Pulp.

Imports of wood pulp into the United Kingdom averaged 860,000 tons a year during the five years 1909–13. The quantity retained for consumption was 844,000 tons; of this total, 315,000 tons were from Sweden, 351,000 tons from Norway, 86,000 tons from other foreign countries (mainly Russia and Germany), 65,000 tons from Canada, and 27,000 tons from Newfoundland.

Of the total, 55 per cent. was mechanical pulp, and 45 per cent. chemical. Of the mechanical, the total imports were 483,000 tons, of which Norway supplied 290,000 tons, Sweden 93,000 tons, and the British Empire 91,000 tons, viz., Canada 64,000 tons, and Newfoundland 27,000. Of the chemical pulp, 377,000 tons were imported, Sweden being the chief supplier with 231,000 tons, Norway supplying 66,000 tons, and other foreign countries 80,000 tons.

The imports from the British Empire were wholly mechanical pulp, and amounted to 91,000 tons, or 11 per cent. of the consumption of the United Kingdom.

As regards possible supply from Empire sources, it may be noted that the total exports of wood pulp from Canada in the year ended 31st March, 1916, amounted to 407,000 tons. In the previous year it was slightly higher at 430,000 tons. Most of the wood pulp exported from Canada has hitherto gone to the United States, but in the case of Newfoundland practically all came to this country. The largest quantity imported from Newfoundland in any one year was 52,000 tons in 1914. It would therefore appear that the total exports of pulp from Canada and Newfoundland in 1914 amounted to over 480,000 tons, or 57 per cent. of the average United Kingdom requirements.

Nor does this figure represent the whole of the Empire trade in this respect, for in the year of greatest export of wood pulp, 1914–15, 1,010,914 cords (or 2,500,000 tons of 50 cubic feet) of pulp wood were exported from Canada, all going to the United States.

From the results of investigations by the Forestry Branch of the Dominion Government, covering some fifty of the principal pulp mills in Canada, it appears that during the three years 1912 to 1914 an average of 1,066,000 cords of wood was used to produce 824,000 tons of pulp, *i.e.*, 100 cords of wood produced over 77 tons of pulp. Applying this percentage to the above figure of exports of pulp wood from Canada, it will be seen that 1,011,000 cords of pulp wood represent about 780,000 tons of pulp. Thus the Canadian exports of pulp and pulp wood in 1914–15 represented about 1,130,000 tons of pulp. Adding the 50,000 tons from Newfoundland, it will be seen that the actual exports of pulp from the Empire in 1914 were nearly 1,260,000 tons, or nearly 50 per cent. in excess of the requirements of the United Kingdom.

It may be noted that although hitherto all the wood pulp imported into the United Kingdom from the Empire was mechanical, large quantities of chemical pulp are produced in Canada. During the years 1909–13, when the total exports of pulp averaged 305,000 tons, about 50,000 tons, or 16 per cent , were chemical. In 1915–16, however, when the total export was 407,000 tons, 175,000 tons, or no less than 43 per cent., were chemical. This amount represents nearly half of the United Kingdom's average requirements of chemical pulp.

Wool.

The estimated consumption of wool in the United Kingdom during the five years 1909-13 averaged 566 million lbs., made up as follows :—

	Mill. Lbs.
British wool retained for consumption ...	95
Imported wool retained for consumption ...	471
Total	566

The total wool clip in the United Kingdom may be estimated at 136 million lbs., and the total imports of Colonial wool were 657 millions, thus giving a total available supply in the United Kingdom of Empire-grown wool of 793 million lbs. With a consumption of 566 million lbs., this gives a surplus of 227 million lbs., without taking into account the 149 million lbs. of foreign wool imported.

The total production of wool in the Empire was about 1,246 million lbs., made up as follows:—

	Mill. Lbs.
United Kingdom	131
Australia	702
New Zealand	197
South Africa	145
British India	60
Other parts	6
Total	1,246

The consumption of wool in the Empire was probably not more than 650 million lbs., or little more than 50 per cent. of the total Empire production.

The total world's production of wool is probably between 2,700 million and 3,000 million lbs., of which the share of the British Empire may be put at between 40 and 45 per cent. Taking the Empire's consumption at 650 million lbs., the consumption of foreign countries is about 2,350 million lbs., of which about 600 million lbs., or 25 per cent., was of Empire production.

The following figures show the total imports into this country of Colonial wool from the principal producing countries, and the quantities retained for consumption in the United Kingdom:—

——	Total Imports.	Retained for Consumption.
	Mill. Lbs.	Mill. Lbs.
Australia	300	131
New Zealand	181	140
South Africa	115	49
British India	55	29

Thus, while Australia produced more wool than was required to satisfy the whole requirements of the United Kingdom market, she actually supplied less than 25 per cent. of the wool consumed in this country. The following figures compiled by the Association of Victoria Wool Growers shows the distribution of Australian wool to various markets in recent years :—

——	Pre-War.	1914-15.	1915-16.
	Per cent.	Per cent.	Per cent.
United Kingdom	22	64	41
Continent	65	9	13
United States	6	15	31
Japan	1	5	6
Local consumption	6	7	9

The United Kingdom consumed in the years 1909–13 70 per cent. of the home-grown wool, 20 per cent. of the Australian supply, 80 per cent. of the New Zealand clip, 35 per cent. of the South African, and 50 per cent. of the Indian.

Varieties of Colonial Wool.

(*a*) *Australian.*—In New South Wales, 91 per cent. of the sheep are merinoes and 9 per cent. cross-breds; in Queensland, 96 per cent. are merinoes and 4 per cent. cross-breds; in Victoria, 36 per cent. are pure merinoes, 23 per cent. are three-quarter merinoes and a quarter English breed, and 15 per cent. are of the various English breeds. As regards the clip, information based on the returns of the Colonial wool sales in London shows that the proportion of cross-bred in the total quantity of Australian wool imported in pre-war days was from 12½ to 15 per cent. Taking 14 per cent. as a reasonable figure, this would give the following result for the years 1909–13 :—

	Mill. Lbs.
Average imports of wool from Australia ...	300
Of which Merino	258
Cross-bred	42

In 1915 the proportions were 16 per cent. cross-bred and 84 per cent. merino, thus giving the following figures :—

	Mill. Lbs.
Total imports from Australia	426
Of which Merino	358
Cross-bred	68

(*b*) *New Zealand.*—80 per cent. of the sheep in New Zealand are cross-breds, and only about 5 per cent. are pure merinoes. Of the New Zealand wool handled in the London market, about 94 per cent. is cross-bred; this gives for the years 1909–13 the following result:—

	Mill. Lbs.
Average imports into the United Kingdom from New Zealand	181
Of which Cross-bred	170
Merino	11

(c) *South Africa.*—Cape wool is chiefly merino, cross-breds not thriving well on the scanty food supply. No data are available as to actual proportion, but taking 90 per cent. of the wool as merino, the following estimate of the imports into the United Kingdom in 1909–13 results:—

	Mill. Lbs.
Average imports into the United Kingdom from South Africa	115
Of which Merino	103
Cross-bred	12

(d) *Indian* wool from India is classified as Joria, Candahar, and Pac Pathan. The last two are chiefly used as carpet wool. No figures are available as to the proportions of the various kinds produced.

(e) *Other Empire.*—This comes mainly from Egypt and the Falkland Islands. The wool from the former is coarse wool, such as is used in the carpet industry, whilst that from the Falkland Islands is cheviot and cheviot-merino crossed.

Dependence of the World's Markets on Empire-grown Merino Wool.

The production of merino wool within the Empire is somewhat as follows:—

	Mill. Lbs.
Australia	600
South Africa	130
New Zealand	10
Other	5
Total	745

i.e. about 25 per cent. of the world's total supply of wool is merino wool from the British Empire.

Some idea of the dependence of foreign countries on merino wool from the British Empire may be obtained from the German import figures. In 1913 Germany imported 440 million lbs. of wool, of which 245 million lbs. were merino and 195 million lbs. cross-bred. Of the total, the British Empire supplied 245 million lbs., of which 197 million lbs. were merino and 48 million lbs. cross-bred, whilst other countries supplied 195 million lbs., of which only 46 million lbs. were merino and 149 cross-bred. Thus, of the 245 million lbs. of merino wool imported into Germany, no less than 80 per cent. was from the British Empire.

If the supply of merino usually obtained from the British Empire were not available, Germany would have to turn to other sources of supply, and the only sources from which this class of wool is available in large quantities are Argentina and Uruguay. Actual figures of merino production in these two countries are not available, but the total wool production may be estimated at 265 million lbs. in the case of Argentina and 135 million lbs. in the case of Uruguay. The proportion of merino in Argentina is not more than 20 per cent., probably less. In Uruguay the proportion is higher, possibly as much as from 60–70 per cent. From this it would appear that the total supply of merino from these countries was about 170 million lbs. This only represents about 70 per cent. of the German imports of merino, without taking into account the demand from other countries on the Continent and the United States of America, which took large quantities of merino wool from the British Empire.

APPENDIX II.

ROYAL COMMISSION ON SHIPPING RINGS, 1909. SUMMARY OF RECOMMENDATIONS.

The majority of the Royal Commission on Shipping Rings (Cd. 4668), whilst recognising that shipping conferences created a certain kind of monopoly (para. 290), thought that on the whole the conference system, fortified by some tie upon the shipper, had many advantages and was indeed necessary where a regular and organised service was required (para. 296). At the same time they admitted that the system had certain possible drawbacks—such as insistence on excessive rates and, in certain instances, diversion of trade (paras. 299 *ff*.).

They were not in favour of drastic remedies such as the abolition of the deferred rebate system (paras. 311 *ff*.) or the establishment of a Board of Control, representing all the interests concerned, including the Colonial Governments, to fix rates of freight (paras. 318 *ff*.), the ground taken being that such power could only be justified if the State were prepared to grant shipping conferences statutory monopolies or to fix their profits.

They made the following main recommendations (paras. 324 *ff*.) :—

(1) That the shippers and merchants in a given trade should form themselves into an association, so that (*a*) they could present a united front to a shipping conference when a controversy arose; (*b*) they could discuss with the conference such matters as—
  - (*a*) rates and classifications;
  - (*b*) dates, number and ports of sailing;
  - (*c*) rebate conditions;
  - (*d*) implied obligations of shipowners (*e.g.*, uniform rates of freight and notice before raising of rates.

(2) That such an association should be registered and recognised by the Board of Trade as the body entitled to confer with the conference lines, if the Board were satisfied as to its representative character.

(3) That where an association recognised by the Board of Trade had failed to reach an agreement with a conference line on any point in dispute the Board of Trade should be empowered—

(*a*) on the application of one of the two parties, to appoint a person or persons to endeavour to promote settlement by conciliation;

(*b*) on the application of both parties to appoint an arbitrator or arbitrators to decide the point at issue.

(4) That in cases *where it appeared to the Board of Trade that there were good grounds for believing that important national or Imperial interests were affected* (and where the dispute had not been settled by conciliation), the Board should have power to appoint persons to inquire into the matter and report to them—it being left to the Board to decide whether the report should subsequently be presented to Parliament or not.

(N.B.—It was suggested that the persons conducting such inquiries should have power to call for the attendance of persons and the production of documents—but that no information should be divulged in the proceedings or report likely to be useful to actual or possible competitors.)

(5) That in order to make the Board of Trade cognisant with the position and proceedings of shipping conferences, conferences making use of the system of deferred rebates

should be required to deposit confidentially at the Board of Trade—

- (*a*) conference agreements;
- (*b*) rebate circulars, &c.;
- (*c*) agreements with associations of merchants and shippers recognised by the Board of Trade.

(6) That all shipping conferences making use of the system of deferred rebates should be required to publish their tariffs, classifications, &c., and to deposit copies at the Board of Trade.

The minority of the Commission, who held strong views as to the disadvantages of shipping conferences (Cd. 4668, pp. 114–116), were not satisfied that the proposals summarised above would form an adequate measure of control.

They agreed with the majority that a real attempt should be made to give effect to a system of conciliation and limited supervision by the Board of Trade, but they thought that the experiment would not be fairly tried if the proposals of the majority were carried out.

They stated that the least which was necessary, in their view, was:—

(*a*) That the Board of Trade should be free to recognise any association of shippers if satisfied that it was adequately representative;

(*b*) That the Board of Trade should be free to direct inquiry (with full powers as to taking evidence and the production of documents) where it appeared that important public interests (including those of consumers and producers) were affected by the action of shipping conferences, or upon the representations of Colonial Governments;

(*c*) That a report as to the nature and result of such inquiries should be presented to Parliament promptly (care being taken not to divulge information likely to be useful to actual or possible competitors).

(*d*) That returns as to shipping conferences, agreements, &c., should be annually presented to Parliament.

(*e*) That, as the majority proposed, tariffs and classifications should be published by shipping conferences making use of the system of deferred rebates, and copies deposited at the Board of Trade.

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Note.—The following is a complete list of the documents relating to the work of the Dominions Royal Commission which have been presented to Parliament:—

REPORTS:—

First Interim Report	[Cd. 6515.]
Second Interim Report	[Cd. 7210.]
Third Interim Report	[Cd. 7505.]
Fourth Interim Report	[Cd. 7711.]
Fifth Interim Report	[Cd. 8457.]
Final Report	[Cd. 8462.]

MINUTES OF EVIDENCE AND PAPERS LAID BEFORE THE COMMISSION:—

London, 1912, *Migration*	[Cd. 6516.]
,, ,, *Natural Resources, Trade, and Legislation*	[Cd. 6517.]
New Zealand, 1913	[Cd. 7170.]
Australia, 1913, *Part I.*	[Cd. 7171.]
,, ,, *Part II.*	[Cd. 7172.]
London, 1913	[Cd. 7173.]
,, *January*, 1914	[Cd. 7351.]
Union of South Africa, 1914, *Part I.*	[Cd. 7706.]
,, ,, ,, ,, *Part II.*	[Cd. 7707.]
London, June and July, 1914	[Cd. 7710.]
Newfoundland, 1914	[Cd. 7898.]
Maritime Provinces of Canada, 1914	[Cd. 7971.]
Central and Western Provinces of Canada, 1916, *Part I.*	[Cd. 8458.]
Central and Western Provinces of Canada, 1916, *Part II.*	[Cd. 8459.]
London, 1914–1917	[Cd. 8460.]

MISCELLANEOUS:—

Memorandum and Tables relating to the Food and Raw Material Requirements of the United Kingdom	[Cd. 8123.]
Memorandum and Tables as to the Trade Statistics and Trade of the Self-governing Dominions	[Cd. 8156.]
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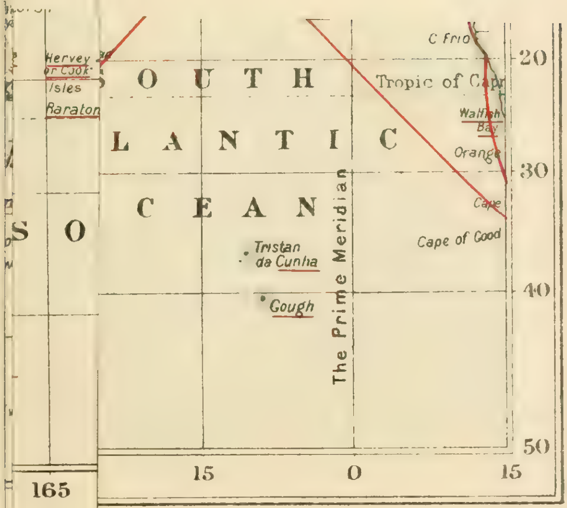

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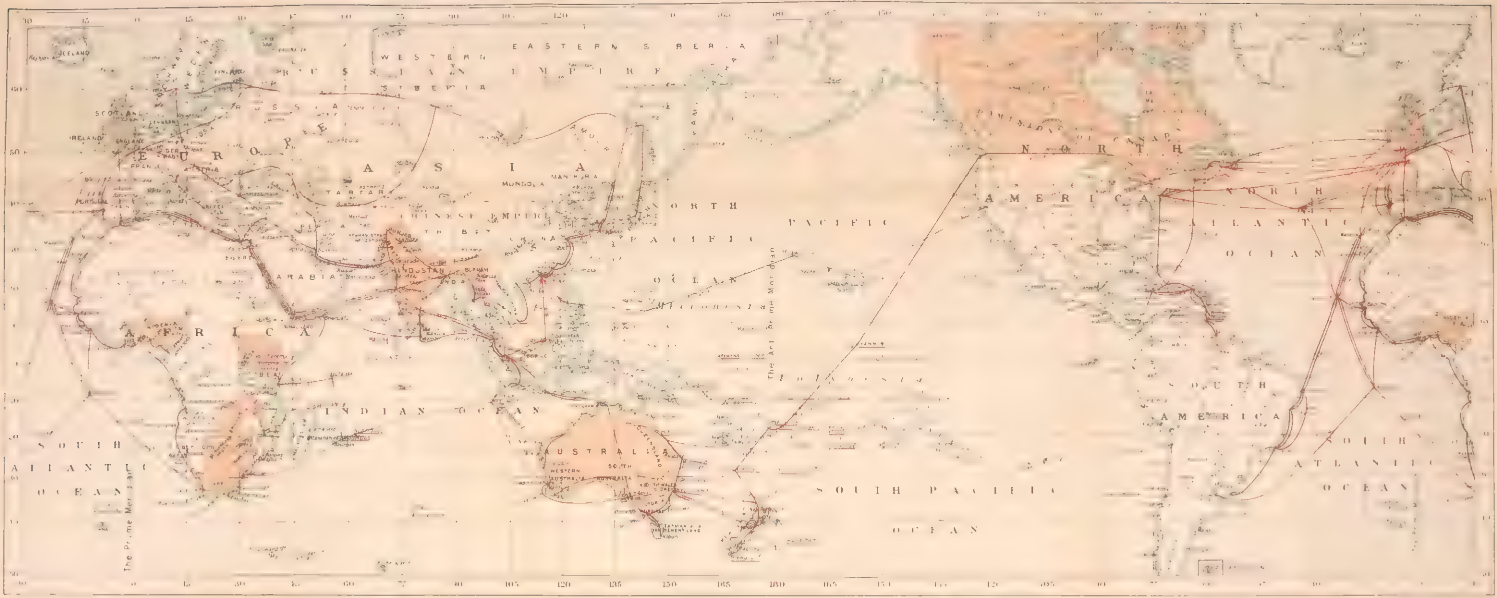

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